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نموذج رقم (١٦)
اقرار والتزام بالمعايير الأخلاقية والأمانة العلمية وقوانين الجامعة الأردنية وأنظمتها وتعليماتها لطلبة الدكتوراه

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تخصص: تمريض صحة بالغين الكليـــــة: التمريض

عنوان الاطروحة: The influence of education on nurses' Knowledge, attitudes, and intentions towards pressure ulcer prevention and treatment.

اعلن بأنني قد التزمت بقوانين الجامعة الأردنية وأنظمتها وتعليماتها وقراراتها السارية المفعول المتعلقة باعداد اطروحات الدكتوراه عندما قمت شخصيا" باعداد اطروحتي وذلك بما ينسجم مع الأمانة العلمية وكافة المعايير الأخلاقية المتعارف عليها في كتابة الأطروحات العلمية. كما أنني أعلن بأن اطروحتي هذه غير منقولة أو مستلة من أطاريح أو كتب أو أبحاث أو أي منشورات علمية تم نشرها أو تخزينها في أي وسيلة اعلامية، وتأسيسا" على ما تقدم فانني أتحمل المسؤولية بأنواعها كافة فيما لو تبين غير ذلك بما فيه حق مجلس العمداء في الجامعة الأردنية بالغاء قرار منحي الدرجة العلمية التي حصلت عليها وسحب شهادة التخرج مني بعد صدورها دون أن يكون لي أي حق في التظلم أو الاعتراض أو الطعن بأي صورة كانت في القرار الصادر عن مجلس العمداء بهذا الصدد.

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THE INFLUENCE OF EDUCATION ON NURSES' KNOWLEDGE,ATTITUDES, AND INTENTIONSTOWARDS PRESSURE ULCER PREVENTION AND TREATMENT

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COMMITTEE DECISION

This Thesis/Dissertation (The Influence of Education on Nurses Knowledge, Attitudes, and Intentions Towards Pressure Ulcer Prevention and Treatment) was successfully defended and approved on --2/12/2011

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Dedication

I would like to dedicate this work to my family and friends who supported and encouraged me throughout this academic journey.

I dedicate my dissertation work to my mother and my father. I am deeply and forever grateful to my parents for their love, support and encouragement throughout my entire life. I am greatly indebted to my mother for her care and love, and to my father for inspiring the importance of hard work and higher education.

I also owe my loving thanks to my wife and my sons. Without their encouragement and understanding, it would have been impossible for me to finish this work.

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List of Abbreviations

Abbreviation	The Meaning of Abbreviation
AHCPR	Agency for Health Care Policy and Research
ANOVA	Analysis of Variance
ATT	Attitudes towards a behavior
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CVI	Content validity index
EPUAP	European Pressure Ulcer Advisory Panel
IRB	Institutional Review Board
JNMC	Jordanian Nurses and Midwifery Council
NPUAP	National pressure ulcer advisory panel
O	Observation or measurement
P	Significant value
PBC	Perceived control over a behavior
PU	Pressure ulcer
R	Randomization
RAS	Risk assessment scale
RMS	Royal Medical Services
RNs	Registered nurses
SD	Standard deviation
SN	Subjective norms
SPSS	The Statistical Package for Social Science
TPB	Theory of Planned Behavior
X	Treatment or intervention

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THE INFLUENCE OF EDUCATION ON NURSES' KNOWLEDGE,ATTITUDES, AND INTENTIONS TOWARDS PRESSURE ULCER PREVENTION AND TREATMENT

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ABSTRACT

BACKGROUND: Pressure ulcer (PU)is not a newly evolving health problem; It has been known since ancient Egyptian times. Despite the fact that pressure ulcer is largely preventable and the increasing expenditure on pressure ulcer preventionand recent major technical advances in health care, yet, pressure ulcer remains a major health care problemandputs a substantial burden on patients and health care professionals as well as hospitals.Nurses experience poor adherence to PU assessment and prevention guidelines.Poor adherence may be due to lack of knowledge and continuing traditional practices, which could be addressed by the implementation of PU prevention and treatment guidelines and studying the attitudes and intentions of nurses.
PURPOSE: This study assessed and examinedthe influence of education on nurses' knowledge, attitudes and intentions towardsPU prevention and treatment.
METHOD: Triangulation method includingexperimental approach using before-after test design and focus groupwere used. A total of 194nurses were recruited from eight hospitals in Amman. Nurses'knowledge about PU was measured by PU knowledge Test, while attitudes and intentions were measured by Pressure UlcerSurvey.Repeated measures, *t*-test and ANOVAwere used to assess and examine the influence of an educational program and the relationship of a set of independent variableson nurses'knowledge, attitudes and intentions towards PU prevention and treatment.Further, to obtain more in depth information about the topic,focus group methodwas used. The thematic analysis guided by Krueger steps was used in analyzing the qualitative data produced through the focus group.
RESULTS: The study results showed that an educational program improves nurses' knowledge, attitudes and intentionstowardsPU prevention and treatment**.**The mean scores of nurses' knowledge for the experimental group improvedsignificantly ($P <$ .001) from (10.5) at pre-test to (15.26) at post-test. There were statistically significant improvements in the mean intentions scores from baseline (M = 12.5, SD = 3.8) to post-education (M = 15.1, SD = 2.5). Paired t test showed statistically significant

difference between pre and post intention scores of the experimental group (*t*=-6.7, *P*=<0.001).This study alsoshowed that demographic variables of nurses have little effects on nurses' knowledge, attitudes and intentionstowardsPU prevention and treatment**.**Findings from the focus group revealed the following four themes: Lack of accurate information about PU management among nurses, positive nurse values toward PU prevention and treatment, experiences and tradition guiding nursing care, and barriers; Short staff, lack of time and equipment prevented nurses from implementing PU prevention and treatment.
CONCLUSION: The educational program conduction improvednurses' knowledge,attitudes and intentions towards PU prevention and treatment which can lead to improve the nursing quality careand decrease cost and human suffering. The study results indicated that there is a need for conducting updated- programs for all nurses to keep thenurses'knowledge onPU built on evidence.Also, findings guidehospitals and health care agencies to developinstitutional protocols and national guidelines that can improve nurses' care practices.
Key words: Pressure Ulcer, knowledge, attitudes, intentions, prevention and treatment.

CHAPTER ONE

Introduction

This chapter discusses the background of nurses' knowledge, attitudes, and intentions towards pressure ulcer prevention and treatment research.It presentstheproblem statement, study purpose and aims, significance of the study,and research questions and hypotheses. Furthermore, this chapter presents the theoretical framework, and the conceptual and operational definitions of the study variables.

Background

Pressure ulcer (PU) still exists as a pervasive trouble in today's health care settings(European Pressure Ulcer Advisory Panel [EPUAP], 2009).A PUremains a significant health problem in terms of human suffering and financial burden (Spilsbury, Nelson, Iglesias, Nixon, &Mason, 2007). Therefore, prevention should be a priority in clinical and non-clinical areas where patients are at risk of developing PU (Hopkins,Dealey, Bale,Defloor,&Worboys, 2006).

A pressure ulcer is "an area of localized injury to the skin, underlying tissueor both, usually over a bony prominence, as a result of pressure or pressure in combination with shear, frictionor both"(EPUAP, 2009, p. 7). A PU develops whenthe tissue is no longer receiving oxygen and nutrients. The main factors related to thedevelopment of PUare the amount and duration of pressure andshearing forces and friction.Abrasion or skin tears are the results of friction, which occurswhen moving a patient against the bed(Hanson, Langemo, Anderson, Thompson,& Hunter, 2010).A PUmay range from Stage One, which is a slight discoloration of the skin, to Stage Four, which is an open ulcerinvolving the bone (Agency for Health Care Policy and Research[AHCPR], 1992). Sitting or lying in the same position for a prolonged period of time could spark the process of tissue breakdown.

Pressure ulcer occurs in both hospital and community settings, affecting all age groups but occursmost often among the elderly, immobile,patients with severe acute illness,and those with neurological deficits.Other significant risk factors of PU development include vasopressin infusion and spinal cord injury (Alderden, Whitney, Taylor, &Zaratkiewicz,2011).

Pressure ulcerisassociated with various consequences such as pain, depression, loss of function and independence, increased incidence of infection and sepsis.Additional consequences may include surgicalinterventions, significant economic costs and prolonged hospitalstays(Eachempati,Hydo,&Barie, 2001). Moreover, Patients with PUare more likely to die compared to those without PU (Landi, Onder, Russo,&Bernabei, 2007).

Pressure ulcerputsa substantial burden on patients and health care professionals as well as hospitals. Consequently, PU preventionhas been a nursing concern for many years. Nurses' knowledge and their competency in this area of practice may lead to reduction in the incidence of PU and better PU prevention and treatment (Reddy, 2006).

Despite the advancement in PU prevention and treatment, nurses and other healthcare providers, and administrators still endure challenges in caring for patients who are at risk of skin breakdown. These challengesare a major concern because of anestimated 18% PU prevalence (Vanderwee et al., 2007) and the costsincurred with PU treatment, which are significant (Chamanga, 2010).

Different strategies have been used for PU prevention and treatment. Clinical guidelines such as EPUAP (2009) for PU prevention and treatment are based on evidence-based research which indicates turning and/or repositioning patients, regular skin inspection and assessment, use of appropriate pressure-relief surfaces, improved

mobility, and adequate nutritional intake.Implementing PU guidelines requires specialized training. Paquayet al. (2010) found that implementation of an education program significantly changed the adherence toguidelineofPU prevention and treatment.

Statement of the problem

Within the Jordanian healthcare settings, there is a dearth ofinformation relating to PU prevention and treatment. No detailed information is available about the nurses' knowledge, attitudes and intentions in Jordan about the prevention and treatment of PU.One of the fewstudies on PU in Jordan (Tubaishat, Anthony, & Saleh, 2009) emphasized the need to raise the awareness of nurses toward PU.Further,four studies published on PU in the Arab world address the incidence of PU(Saleh, 2007), the impact of risk assessment scales on patient’s outcome among hospitalized patients (Saleh, Anthony, & Parboteeah, 2009), nurses' knowledge about prevention and treatment of PU(Abou El Enein&Zaghloul, 2011),and prevalence of PU in Jordan(Tubaishat et al., 2009)

The issue of PU prevention and treatment is of national and international concern. The true scale of the problem is unknown, but it is vastly underestimated (Anthony et al., 2008; Day et al., 1997). Kaltenthaler et al. (2001) reported a PU incidence rate of between 2.2% to 29% per annum in the UK and 8.5 to 13.4 percent in the USA and Canada.Reports on the prevalence in some European countries indicated an increase from 7% in 1995 to 28% in 2004 inGermany and 15% in 1995 to 33% in2004 in the Netherlands (Tannen et al., 2004; O’Dea, 1995). In a recent study, Vanderwee et al. (2007) reported an 18.1% PU, stages one to four, prevalence rate in 25 hospitals from five European countries. Compared to developed countries, PU incidence and prevalence demonstrated higher rates in Saudi Arabia (Saleh et al.,

2007). In Jordan, the overall PU prevalence rate in hospitals is 12% (7% when Grade I excluded) (Tubaishat et al., 2009).

Several guidelines were developed to manage PU in terms of prevention and treatment.The guidelines for the prevention and treatment of PU were developed based on scientific research evidence and have been promoted by programs and campaigns of authoritative organizations(EPUAP, 2009). Nonadherence by nurses to these guidelines is often found(Halfens&Eggink 1995; Panagiotopoulou& Kerr 2002; Meesterberends et al., 2010; van Gaal et al., 2010).The compliance of nurseswith a guideline was found to be influenced by severalbarriers (van Gaal et al., 2010).The attitudes and lack of knowledge areprobable barriers to using guidelines in clinical practice(Ajzen & Madden, 1986; van Gaal et al., 2010).

Limited application of knowledge is a common problem in clinical practice (Gunningberg, Lindholm, Carlsson, & Sjoden, 2001). Nurses are not fully aware of using up-to-date PU prevention and treatment protocols and may have not been exposed to current evidence-basedpracticesand routinely based on intuition, experience or habit (Gunningberg, 2005).Jordan O'Brien and Cowman (2011) found a significant gap between nursing records of skin condition with actual skin examination in relation to PUwhich means that nurses areunable to identify the early signs of PU development.

Lack of knowledge and skills in PU prevention and treatment may be a problem. Therefore, nurses require the need to receive regular training and education in this area of practice (Gunningberg, 2004). Improved nurses' knowledge about appropriate identification PU stages may improve appropriate prevention and treatment of PU(EPUAP, 2009)and can lead to reduced PU incidence(Chamanga, 2010). Moreover, increased nurses' knowledge about PU prevention and treatment may

improve patient outcomes in terms of reduced hospital stay, reduced pain, reduced cost burden, and reduced human suffering(Smith & Waugh, 2009).

Significance of the study

The current study assessed and examined nurses' knowledge, attitudes and intentions towards PU prevention and treatmentemploying aPU educational program. Nurses’ knowledge, attitudes, and intentionsare vital since these variables shape the nurses' behaviorsto provide better quality of nursing careto those patients at risk of PU development and/or having a PU.Improved nurses’ knowledge of PU prevention and treatment enhances early recognition of skin breakdown, risk assessment, and treatment options of a PU which assists in preventing unnecessary complications and consequences of PU such as pain, cost burdens, and human suffering (Wann-Hansson, Hagell, &Willman, 2008).

Many studies addressed nurses’ knowledge about PU prevention and treatment guidelines; however, few studies explored the relationships and factors that influence PU prevention and treatment (Moore & Price, 2004;Pancorbo-Hidalgo et al., 2007) as well as no documented studies about the intentions of nurses towards PU care in clinical practice. In Jordan, there was one published nursing study about prevalence of PU(Tubaishat, Anthony, & Saleh, 2009).

The current study is the first of its kind in Jordan and in the Arab world that used triangulation method. It explores whether demographic variables such as nurses' age, gender, clinical experience, education level, and previous involvement in PU research have a significant influence onnurses’ knowledge, attitudes, or intentions towards PU prevention and treatment. The findings of this study can be baseline to nurses and health care professionals and may also contribute to the development of an educational platform on PU prevention and treatment at national and

internationallevels. Also, the current study provides an opportunity to evaluate nurses' knowledge, attitudes, or intentions towards PU prevention and treatment employing triangulation (quantitative and qualitative) methodswhich contribute to research evidence in this area of practice. Further, there are no PU clinical guidelines demonstrated in Jordan which may produce better opportunity to compare nurses' knowledge to their practice in clinical settings.

Thisstudy makes a national unique contribution to this area.IdentificationofJordanian nurses' knowledge about PU prevention and treatment in addition to attitudes and intentions show a bigger view and guide strategic planning of educators and managers regarding these issues. This may enhance the integration and satisfaction among educators, managers, and nurses that lead to better outcomes in terms of high nursing quality of care, decreased human suffering, and decreased cost burdens. Internationally, using more than one tool in the study in relation to demographic variables adds a valuable contribution regarding the cultural sensitivity values of these tools.

Purposes of the study

The purpose of this study is to assess and examine the influence of using a pressure ulcer educational program onnurses' knowledge, attitudesand intentions towards PU prevention and treatment.

Aims.

1. To assess nurses'baseline knowledge, attitudes, andintentionstowards PU preventionand treatment.
2. To examine whether there is a difference in nurses'knowledge, attitudes, and intentions towards PU prevention and treatment based on gender, age, experience,sources of education, and the nurses' level of education.

3. To identify nurses' perceived barriers towards PUprevention and treatment.
4. To examine whether nurses' who receive PU education will show improved knowledge, attitudes, and intentions to implement PU prevention and treatment strategies as compared to a comparisongroup.

Research questions

1. Is there a difference innurses' knowledge, attitudes, andintentionstowardsPUprevention and treatment based onselected demographic variables?
2. What are nurses' knowledge,attitudes, and intentionsonPUprevention and treatment?
3. What arenurses' perceived barriers towards PU prevention and treatment?
4. Will an educational program on PU improve nurses' knowledge, attitudes, and intentions towards the prevention and treatment of PU?

Theoretical Framework

Ajzen's Theory of Planned Behavior (TPB)(Ajzen, 1985; Ajzen & Fishbein, 1980) guided the study by providing insight into PU educational program effectiveness.This theory allows for the prediction of behavior by examining changes in attitudes, perceived behavioral control, subjective norms (what others think we should do), behavioral intent, and actual behavior (Ajzen & Madden, 1986). According to the TPB, attitudes towards a behavior (ATT), perceived control over a behavior (PBC), and subjective norms (SN) lead to one's intentions to change a behavior (behavioral intent). Behavioral intention (BI) then leads to actual behavior.According to this model, behavioral intentions are influenced by a person's attitude toward performing a behavior, and by beliefs about whether individuals who are important to the person approve or disapprove the behavior (subjective norm). The TPB assumes all other

factors (e.g., culture, the environment) operate through the model' constructs, and do not independently explain the likelihood that a person will behave a certain way (Ajzen, 1991).

Ajzen and Madden (1986) and Nash et al. (1993) argue that perceived control is an important determinant of an individual's behavioral intent and this control is influenced by exposure to education.

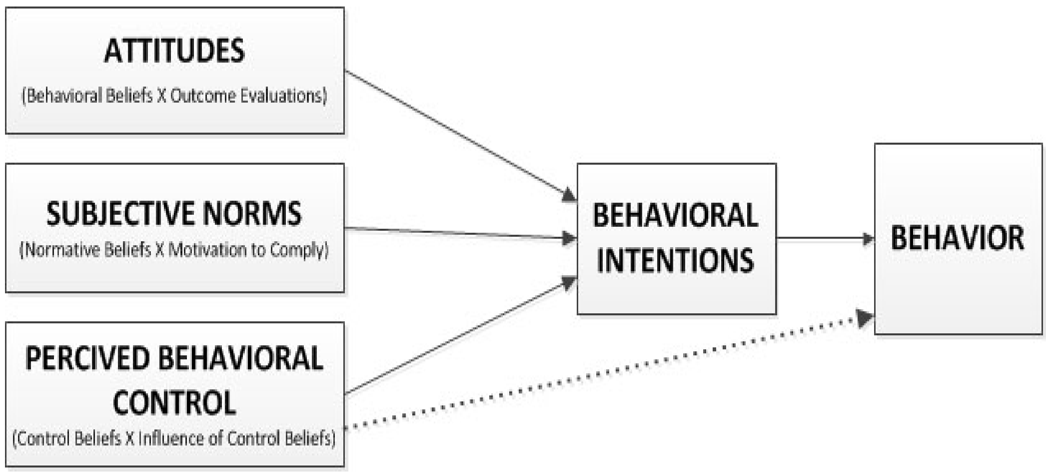


Figure 1.Ajzen, I. (1991). The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes, 50, p. 179-211.

The Theory of Planned Behavior (Ajzen, 1988, 1991) proposes a model about how human actionis guided. It predicts the occurrence of a specific behavior provided that the behavior is intentional.The model is depicted in Figure 1 and represents the three variableswhich the theory suggests willpredict the intentions to perform a behavior. Intentions are the precursors of behavior.

Simply, the TPB states that an individual will probably engage in a behavior if he or she intends to engage in that behavior. Intentions to engage in a behavior are influenced by favorable or unfavorable beliefs about the behavior (attitudes), perception of social pressure to perform the behavior (subjective norms) and perceived ability to perform the behavior (perceived behavioral control).For example, to predict

whether or not a nurse will follow prescribed guidelines of PU prevention and treatment, the best predictor would be to assess whether the nurse intends to adhere to those guidelines. The intentions will be influenced by the nurses' attitudes towards the guidelines (e.g. Do I have a favorable opinion of these guidelines? Do I think that following them will lead to positive outcomes?), his or her perception of the subjective norms related to the guidelines (e.g. Will my coworkers and supervisors approve of me following these guidelines?), and his or her perceived behavioral control (e.g. How easy will it be for me to carry out these guidelines?). If the nurse has a positive attitude towards the behavior related to the guidelines, believes that others would approve of the behavior, and believes that he or she has the capability to engage in the behavior, then it is expected that his or her intentions will be strong and the behavior should occur.

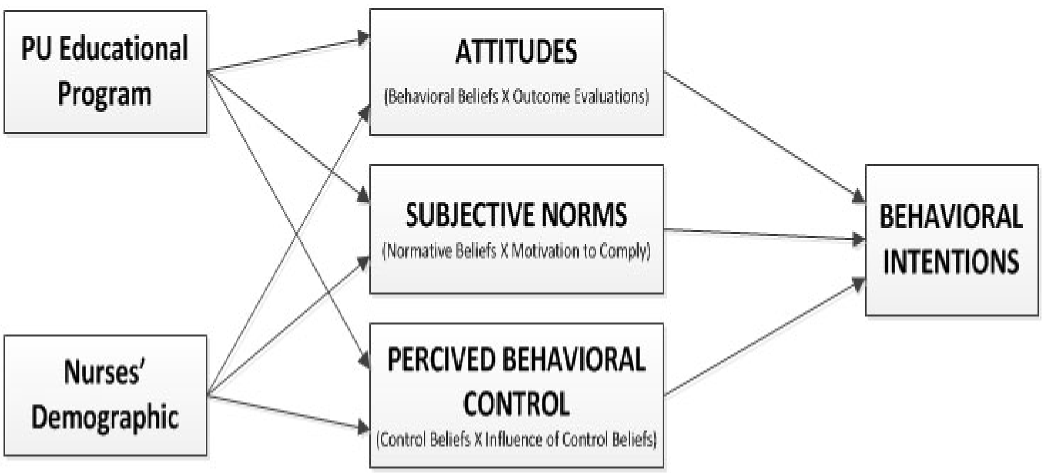


Figure 2. The study theoretical framework based on the Theory of Planned Behavior (Ajzen, 1991)

Definition of terms

Attitude.

Conceptualdefinition: Attitude refers to an individual's positive or negative evaluation of performing a behavior based upon his beliefs that the behavior leads to certain outcomes and his evaluation of these outcomes (Ajzen & Fishbein, 1980). It is assumed to havetwo components which work together: beliefs about the consequences of the behavior (behavioralbeliefs; e.g. 'Continuous nursing assessment of patients will give an accurate account of their pressure ulcer risk') and thecorresponding positive or negative judgments about each of these features of the behavior (outcomeevaluations; e.g. 'Most pressure ulcers can be avoided').

Operationaldefinition: Attitudes in this study are measured by calculating the total scores of items of section one of the Pressure Ulcer Survey. Higher scores indicate more positive attitudes towards pressure ulcer prevention and treatment.(Appendix 4)

Intentions.

Conceptualdefinition: Intentions are a measure of people's motivation to engage in particular behaviors(Oppenheim, 1992). Although there is not a perfect relationship between behavioral intentions and actual behavior,intentions can be used as a proximal measure of behavior (Ajzen, 1991).Thus, the intentions of nurses in this study are assessed to determine the effectiveness ofimplementation of PU educational programs using Pressure Ulcer Survey.

Operationaldefinition: Intentionsare measured by calculating the total scores of items of a section related to intentions of the Pressure Ulcer Survey. Higher scores indicate that the nurse has positive intentionstowards pressure ulcer prevention and treatment.(Appendix 4)

Subjective norm.

Conceptualdefinition: This term refers to the normative component of behavioral intentions.Subjective norm is based upon an individual's perception that specific salient referents think that he/she should or should not perform the behavior and his/her motivation to comply with these salient referents(Ajzen & Fishbein, 1980).

Operationaldefinition: Subjective norm in this study is measured by calculating the total scores of items related to the subjective norm in the intentions section of the Pressure ulcer Survey. Higher scores indicate that subjective norm has a bigger effect on nurses towards pressure ulcer prevention and treatment (Appendix 4).

Perceived behavioral control.

Conceptualdefinition: Perceived behavioral control is the extent to which a person feels able to enact the behavior (Ajzen, 1991). It hastwo aspects: how much a person has control over the behavior (e.g. low control over applying pressure ulcer relieving device if the device is often not available); and how confident a person feels about beingable to perform or not perform the behavior (e.g. sufficiently skilled or not in using a pressure ulcer relieving device). It is determined by control beliefs about the power of both situational and internal factors toinhibit or facilitate the performance of the behavior (e.g. 'whether I apply a pressure ulcer relieving device is entirely up to me'; 'I could apply pressure ulcer relieving device for my patient if I wanted to').

Operationaldefinition: In this study, perceived behavioral control ismeasured by calculating the total scores of items related to perceived control in the intentions section of the Pressure Ulcer Survey. (Appendix 4)

Summary

This chapter introduced the statement of the problem, the significance of the study,the purpose and research hypotheses, conceptual framework, and definitions of

the study variables. The background to the PU problem has been clarified in term of consequences and complications in order to understand the problem.The Theory of Planned Behavioris used as atheoretical framework.The next chapter offers a critical review of the literature in order to facilitate an understanding of the problem related to nurses' knowledge, attitudes, and intentions towards PU prevention and treatment. It also seeks to identify gaps in the literature.

CHAPTER TWO

Literature Review

Introduction

The occurrence of PU during a hospitalization plays a significant role in increasing length of hospital stay and health care costs in addition to human suffering(Spilsbury et al., 2007).The role the nurse plays in skin assessment, identification of risk for PU, and preparing the prevention plan of care are essential to improving patient care and achieving a cost of care reduction(EPUAP, 2009).

This chapter discusses literature relevant to the research purposes of this study. The literature review focuses on the nurses' characteristics in relation to PU,pressure ulcer knowledge in nursing, pressure ulcer education and attitudes, and studies in the Arab world. Additionally, studies that used the Theory of Planned Behavior (TPB) as theoretical frameworks are discussed.

Search strategy involvedElectronic databases, including the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, online nursing and medical journals, the Cochrane Library, internet sources, and relevant journals in theArab world. Search terms included bedsores, pressure ulcer prevention,nurses' attitudes towards pressure ulcer prevention, nurses' intentions towards pressure ulcer prevention and treatment, pressure ulcer guidelines, pressure ulcer nurses' knowledge, and pressure ulcer education. Inclusion criteria included all study types. Most literature reviewed had been published within the past 10 years, but some journal articles published before1995 were included. The search included only those studies written in English.

Nurses' characteristics in relation to PU prevention and treatment

The relationship of nurses' characteristicssuch as gender, age, current education degree, years of clinical experience, being previously involved in PU research, and attending aPU courseswithPU prevention and treatmentis still being debated in the literature due to variable methods used (Ayello, Baranoski, &Salati, 2005; Choa,Parkb,& Chunge, 2011; Hulsenboom, Bours, & Halfens, 2007;Lamond&Farnell, 1998;Pancorbo-Hidalgo, Garcia-Fernandez, Lopez-Medina,& Lopez-Ortega, 2007).

Although Choa et al. (2011)analyzed nurses' characteristics in relation to preventive pressureulcer care practicesand found that more nursing interventions were documented by those who were younger, less experienced, and more educated, Ayello, BaranosKi and Salati(2005) found that 62% of hospital nurses felt confident in their ability to stage pressure ulcers. Less than50% of new nurses believed they could consistently stage pressure ulcers with confidence but this was found to improve with age and experience. Lamond and Farnell (1998) compared knowledge base and decision-making accuracy in PU management among novice and expert nurses and found that expertnurses made clinical decisions more accurately than novices. For the novices, the difference was determined by quality of the knowledge base; those with a sounder knowledge base made better decisions than those with a poorer knowledge base.

Pancorbo-Hidalgo et al.(2007)found an association between holding a university degree, undergoing postgraduate education or taking part in research, and higher knowledge and implementation scores for pressure ulcer recommendations.On the other hand, Hulsenboom, Bours, and Halfens (2007) found that the demographic variables including age, gender, and experience of nurses had no significant influence on nurses' preventive pressure ulcer care practices.

Pressure Ulcer Knowledge among nurses

Pressure Ulcer care knowledge among registered nurses (RNs)is not well documented (Zulkowski, Ayello, & Wexler, 2007). Several studies employed different methods, tools, and population found that nurses' knowledge related to PUprevention and treatment is poor (Abou El Enein & Zaghloul, 2011; Halfens & Eggink, 1995; Moore & Price, 2004; NICE, 2005; Peiper & Mott, 1995; Peiper & Mattern, 1997).

Literature reviewed that nurses often score poorly on tests measuring knowledge of PU identification, staging, and prevention (NPUAP, 2009).Two recent studies conducted to evaluate the knowledgeabout prevention and treatment of PUrevealed that the nurses' knowledge regarding PU prevention and treatment is poor and below the acceptable levels (70%)(Abou El Enein & Zaghloul, 2011;Beeckman, Defloor, Schoonhoven, & Vanderwee, 2011).The first study wasadescriptive cross-sectional study using an interview questionnaire.The results revealed thatnurses' overall mean scores was below the minimum acceptable level (below 70%)(Abou El Enein & Zaghloul, 2011).The second study was conducted to evaluate the knowledge and attitudes of nurses in Belgian hospitals on PUprevention usingacross-sectional multicenter method.The resultsrevealed thatnurses knowledge about PU prevention in Belgian hospitals was poor(Beeckman, Defloor, Schoonhoven, & Vanderwee, 2011).

On the contrary, Zulkowskiet al.(2007)concluded that 34% of the nurses scored higher than 79% on a PUtest whichincluded questions about PU staging where 63% of the participants had attended a lecture, read information about pressure ulcers, or used the Internet to obtain information about PU within the previous year. Further, a 2005 survey addressed nurses' confidence in staging PU. Confidence was found to improve with age and experience. The surveyfound that 62% of hospital nurses felt confident in

their ability to stagePUandless than50% of new nurses believed they could consistently stage PU(Ayello, Baranoski, & Salati, 2005).

While nurses who had correctanswers about the risk assessment scale (Braden Scale) were almost evenly divided. Certified wound care nurses correctly answered a question about the classic signs and symptoms of wound infection. Nurses not certified in wound care did not perform the same (Ayelloet al.,2005). Furthermore, certified wound care nurses were more comfortable making wound dressing recommendations all or most of the time compared to noncertified nurses. It was recommended that educational programs for nursing students should include current PU prevention and treatment methods.Nursing medical/surgical textbooks may contain sparse or outdated information (Ayello & Meaney, 2003).Additionally, inappropriate knowledge and education were associatedwith higher PU prevalence rates (Boxer & Maynard, 1999). In this regard, Gould (1992) concluded that undergraduate nurses received inadequate PU prevention and treatment education. Similarly, the use of risk assessment scales, the choice of appropriatedressings, and wound infection management were the least known areas of knowledge among Spanish nurses (Pancorbo-Hidalgo et al., 2006).

Pressure Ulcer Education and attitudes

Education is a first step in providing quality care (Cullen & Cox, 2005).Educating staff is seen as being important for both the prevention and treatment of PU. To minimize the risk of PU damage, the multidisciplinary team needs to be able to recognize the early signs of pressure damage and plan appropriate evidence-based care (Jordan O'Brien & Cowman,2011; Lloyd Jones, 2007).Education programs focusing on promoting skin integrity from different perspectives have been shown to be effective in reducing PU incidence rates. These programs addressedseveral dimensions

such as skin assessment, PU risk assessment, appropriate use of equipments and basic skin care (Bales & Padwojski, 2009).

Jordon O' Brian (2003) showed that the incidence of Stage I and Stage II PUs decreased following application of an educational session on skin assessment and a subsequent implementation of prevention protocols. After studying 6 Minimum Data Set (MDS) quality indicators, Bostick (2004) discovered a lower prevalence of Stage I to Stage IV PUs in facilities with increased RN staff time which was associated with a 3% reduction of patients developing a PU.

Although PU education improves knowledge, studies also indicate that regular educational updates are needed to maintain and improve PU knowledge and practice standards (Sinclair et al., 2004). Importantly, studies suggested that improved identification of PU and knowledge of PUprevention and treatment are associated with a reduction in the rate of hospital-acquired pressure ulcers (Finlay, Smith, & Abrams, 2004; Young, Evans, & Davis, 2003). Nursing education on PU identification and staging is clearly warranted.

It is important that healthcare providers,especially nurses, have adequate knowledge and positive attitudestowardsPU prevention and treatment (Gunningberg, 2001;Moore & Price, 2004).Changing attitudes may have a positive influence on the uptake of evidence.Negative attitudes towards PU prevention and treatment associated with lack of knowledge were evident among nursing home settings (Demarre et al.,2009).

Attitudes towards PU prevention and treatment also depend on the individual's own attitudes on the subject area. Based on the knowledge acquired, the individual staff member forms his/her attitudes and can make a decision to adopt or reject the new

knowledge and the innovation that follows.However, knowledge alone is often not enough to change behaviour(Moore & Price, 2004).

A positive attitude towards PU prevention and treatment should also be promoted, since attitudes are influential to nurses' behaviors. According to Thomson O'Brien and colleagues,and in order to significantly increase the potential for changing clinical practice, effective implementation must encompass education, auditing, feedback, and mentoring(Thomson O'Brien et al., 2000).

Despitenurses' positive attitudes towards PU prevention (Moore & Price, 2004), various studies revealed a gap between theory and practice (Bours et al., 2002; Jordan O'Brien& Cowman, 2011; Rodgers, 2000). Bours et al. (2002) described the positive effect of monitoring PU each year and giving feedback to hospitals on the use of effective preventive interventions.Educational programs can improve decision making, and informed decision making can reduce the incidence and prevalence of PU(Moore, 2001).

Few studies have been conducted on attitudes of nurses towards PU prevention and treatment (Bostrom & Kenneth, 1992; Hill, 1992; Maylor & Torrance, 1999; Moore & Price, 2004). Bostrom and Kenneth (1992)highlighted a variety of environmental and clinical factors influencing nurses' ability to preventpatient skin breakdowneven when they have had sufficient knowledge of risk factors for keeping proper skin integrity of thepatient. Furthermore, 245participants from multiple health care settingshad a lack of interest and low priority ofPU prevention and treatment in nursing care which was considered the main barrier to effective PU prevention and treatment. In comparison, Maylor and Torrance (1999) assessed the prevalence of PUin relation to nurses' knowledge and attitudes employing cross-section study of trained and untrained staff from several areas of work in the acute and community settings.

Results revealed no differences between trained and untrained nurses and emphasized that the problem could beat individual or institutional levels along with alack of individual motivation as a barrier of effective PU prevention and treatment. In contrast, Moore and Price (2004) found thatnurses generally had positive attitudes towardsPU prevention and treatment. The positive attitudes were negativelyaffected by barriers such aslack of time and lack of nursing staff(Moore& Price, 2004).Hill (1992) also mentioned a lack of knowledge and insufficient equipment as barriers that prevent healthcare providersto maintain effective PU prevention and treatment.

Arab studies

Four studies have been published on PU in the Arab world. All concerned PU prevalence, incidence and risk assessment scale in Saudi Arabia and in Jordan. The overall prevalence rate was 12% (7% when Grade I excluded) in Jordan (Tubaishat, Anthony, & Saleh, 2009).

A study was conducted in Saudi Arabia to investigate the impact of a risk assessment scale on a patient's outcome among hospitalized patients. The study concluded no superior effect in using risk assessment scale compared to nurses' judgment (Saleh, Anthony, & Parboteeah, 2009).

A descriptive cross-sectionalstudy employed an interview questionnaire format to assess nurses' knowledge on PU prevention and treatment at one of the largest health hospitals in Egypt.The study results revealed that nurses' knowledge regardingPU prevention and treatment is inadequate and below acceptable levels (70%).Nurses overall mean scores were below 70% in useful measures and 66%in the non-useful measures on the questionnaire (Abou El Enein & Zaghloul, 2011).

Studies using TPB as a framework

The TPB has been applied to the prediction of behaviors of health care professionals, including nurses treatment of HIV-infected patients (Tessaro & Highriter, 1994), doctors’ use of clinical guidelines for asthma treatment and antibiotic use (Limbert & Lamb, 2002), and pharmacists' treatment intentions for vaginal candidiasis using non-prescription medications(Walker et al., 2004). Randalland Gibson (1991) studied ethical decision making in the medical profession and found the TPB significantly predicted whether or not nurses would report another medical professional for a medical error.

The TPBhas predicted the application of new techniques and information by nurses in medicaland behavioral health settings(Liabsuetrakul et al., 2003;Roelands et al., 2006). Indeed Lamond and Farnell (1998) pointed out that nurse with sounder knowledge bases made better clinical decisions than those with poorer knowledge bases, thus reiterating the importance of education.The Theory of Planned Behavior can be useful in designing strategies to help people adopt healthy behaviors and to help clinicians increase their uptake of guidelines.

Kortteisto et al. (2010) used an internet-based survey as part of a cross sectional study to investigate the adherence of health professionals towards clinical practice guidelines. The authors found that the attitudes towards the behavior, the subjective norm, and the perceived behavior control were important factors associated with the professionals' intentions to use clinical practice guidelines. Nurses were found to have a subjective norm as the strongest factor which reflects that social pressures facilitate or hinder the intentions to use clinical guidelines, while the key factor for physicians was the perceived behavior control factors ($p < 0.01$) effects on these intentions in comparison to other professionals. The findings of the study suggested that the

TPBmay be a suitable theoretical basis for implementing clinical guidelines in healthcare practices.

In comparison, Godin et al. (2008) conducted a systemic review of 78 studies to discover the determinants of health professionals' behaviors, and found that the TPB can predict behavior better than other social cognitive theories while the other theories better capture the dynamic underlying intentions. But, the authors warn that caution must be taken in the methodology which could affect the results of the study, so special care should be given to better define the context of behavior performance.

On the other hand, Sniehotta (2009) argued that the TPB has little contribution to the behavior change, and the change in intentions does not mean change in the behavior. Armitage (2001) reviewed 185 studies that used the TPB as a framework and found that the TPB reflects 27% of variance in the behavior and 39%of variance in the intentions.

The above studies revealed that TPB is suitable to be used as a framework in predicting the behaviors of the healthcare professionals. It is important to keep a consideration to the context in which the behavior occurs. This study used TPB as a framework in exploring the attitudes and intentions of RNs towards prevention and treatment of PU.

Summary of Literature Review

In summary, there is still much to be learned about PU in health care settings. Studies in the literature in Jordan are very limited in this area despite the fact that the developing PU will lead to human and financial burdens. Finally, it has been cited that basic nursing education is not enough in preventing and treatingPU and additional education and certification are often needed.

There are currently limited studies in the literature that address the problem ofnurses' knowledge, attitudes and intentions towards pressure ulcers in health care setting. More studies are needed to improve thequality of care pressure ulcer. Future studies should look into howimprovement in knowledge will translate to enhancement in quality of care relating topressure ulcer.

CHAPTERTHREE

Research Methodology

Introduction

This chapter describes the research design, setting, population, instruments(Nurses' Characteristics, PU Knowledge Test, Attitudes , Barriers, and Intentions Tools)questionnaire, datacollection, data analyses plan, and ethical considerations. Additionally, validity of data and the psychometric properties of the tools arediscussed.

Research Design

The purpose of this study is to assess and examine the influence of using a PU educational program on nurses' knowledge, attitudesand intentionstoward PU prevention and treatment.Triangulation method(mixed method)wasused in assessing and examining the nurses' knowledge, attitudesandintentions towards PU prevention and treatment. Triangulation is an approach to research that uses a combination of more than one research strategy in a single investigation (Speziale & Carpenter, 2007). The current study was conducted in two phases: the first was the quantitative experimental phase (core phase) while the second was the qualitative focus group method(complementary phase).

Quantitative Approach.

The knowledge, attitudes, intentions, and nurses' characteristics factors in determining behavior were assessed and examined employing anexperimentaldesign (before-after test design).The experimental design was selected because itis the most powerful method in testing hypotheses of cause-and-effect relationshipsbetween study

variables.It also offers the highest control over extraneous variables (Polit & Beck 2008).

The pre-test and the post-test were administered to all participants in both groups(experimental and comparison) separately. The experimental group attended the PU educational program, while the comparison group received no education.

The symbolic representation of a pretest-posttest experimental design as follows:

R (Random selection)O1 X O2 O3 (Experimental group)

R (Random assignment)

R (Random selection) O1 O3 (Comparison group)

Figure 3.Research Design (key: R: randomization, O: observation, X: treatment).

Setting

The study was conducted in Jordanian hospitals located in Amman, the capital of Jordan. The healthcare system in Jordan consists of two sectors: the public health sector (The Ministry of Health [MOH], The Royal Medical Services [RMS], and two teaching hospitals) and the private health sector. The private sector accounts for 34 percent of hospital beds with an occupancy rate of 46.2 percent (MOH, 2009). Only institutions providing secondary services (hospitals) were included where the PU care isusually provided.

Jordan hospitals are about 104 in number, and these are either public or private. Jordan has quite an advanced health care system, although services remain highly concentrated in Amman. Amman is the capital of Jordan located in the middle region of

Jordan and contains fifty- two (50% of total hospitals in Jordan) hospitals with 6305 beds total capacity according to MOH annual statistical report (MOH, 2009).

Only those hospitals having Medical, Orthopedic, ICU, Burn, Surgical, or CCU units and having 150 beds or more were included to assure exposure of participants to PU cases.This selection was done to ensure an adequate number of nurses working in these hospitals. There are 12 hospitalswith 150 or more beds but only 8 hospitals were included because one was a psychiatric hospital and three were military hospitals where the researcher had no access. The steps of selecting hospitals are illustrated in Figure 4.

The data in this study pertain to nurses working in hospitals of Ammanregion of Jordan.However, as the hospital nursesin Ammanregionaresimilar to those of other Jordan regions, and there are no great regional differences in the type of education that nurses receive, the researcher believes that the results of this study can be applied to all nurses working in the Jordan healthcare system.

Sample and Sampling

Registered nurses who provide bedside care were the target population in this study. Population is the total of cases about which the researcher would like to make generalizations (Polit& Beck, 2008). The accessible population consisted of all eligible RNs who worked in the selected8 hospitals.For more details see figure 4.

Systemic random sampling was used, since it is a type of probability sampling needed in an experimental approach.The primary function of randomization is to secure comparable groups, that is, to equalize groups with respect to extraneous variables (Polit & Beck, 2008). Random selection does ensure that differences in the attributes of the sample and the population are purely a function of chance. The list of the random sample of participants was drawn from the population of RNs who met the eligibility criteria. The eligible participantswere all male and female RNs who have

acquiredbachelor's or Master's degrees in nursing and provide directcare nursing in their hospital units (Medical, Orthopedic,ICU, Burn, Surgical,and CCU)with at least one year of clinical experience.The eligible participating clinical RNs were randomly assigned to either the experimental or comparison group.The steps of selecting hospitals, sample and sampling are illustrated in Figure 4. The term experimental grouprefers to a group of participants who received the treatment (attended PU educational program) while the comparison group refers to a group of participants whose performance on a dependent variable is used to evaluate the performance of the experimental group. Random selection means that every RN has an equal chance to be involved in the selected sample, while random assignment means that those RNs involved in the selected sample have an equal probability to be either in the experimental or comparison group (Polit & Beck, 2008).

Sample Size Estimation.

The sample size was calculated using a freely-available statistical software packagecalled the statistical software (G*Power version three) (Faul, Erdfelder, Lang, & Buchner, 2007). Estimated sample size for independent sample *t*- test was 82 participants for each group based on medium effect size of (0.5), power .80 and (α = 0.01), and for Analysis of Variance (ANOVA) test with a medium effect size of (0.15), power .80 and (α = 0.01) the total sample size was 192participants. Medium effect size assumed based on literature (Elliott et al.,2008;Moore & Price, 2004).More numbers were included in the study (N = 220) to replace missing or withdrawn cases, and to provide better validity of results.

Instruments

For the experimental phase of this study five tools were used to collect the data about nurses' demographic characteristics, knowledge, attitudes,intentions, and perceived barriers of PU (appendices 1, 2, 3, 4, p. 104, 105, 109, 111).

A. Demographic characteristics include gender, age, years of clinical experience, current level of education,previous participation in PU research, sources of PU education, and recent exposure to pressure ulcer education (appendix 1, p.104).

B. ThePU Knowledge Test tool (p. 105), developed and validated by Beeckman et al. (2009), was used to examine the nurses' knowledge level about pressure ulcer assessment and prevention. Permission to use the instrument was taken in advance from the developer (Appendix 6, p. 114).The test includes a26-item instrument reflecting 6 themes expressing the mostrelevant aspects of pressure ulcer:

(1) Etiology and development.

(2) Classification and observation.

(3) Nutrition.

(4) Risk assessment.

(5) Reduction of the magnitude of pressure andshearing.

(6) Reduction of the duration of pressure andshearing.

The instrument multiple-choice questions have 3 answer options, and the fourth Was an''I do not know the answer'' option. The latter answer was included to avoid the respondents guessing. The number of questions varies according to relevance to the topic.Questions and answers were based on evidence-based literature and conform to the 2009 internationalguidelines of pressure ulcer prevention and treatment(Vanderwee et al., 2007, 2008; Dealey & Defloor,

2009).

C. Pressure Ulcer AttitudesTool,developed and validatedbyMoore(2004), was usedto assess nurses' attitudes towards PU prevention and treatment where the response-option utilizes a 5-pointLikert scale (p. 109).This tool using allows scaling of an individual's attitudes to an issue and is more sensitive to the full range of possible attitudes than a simple dichotomous agree/disagree option (Oppenheim, 1992).

D. Pressure Ulcer Intentions Tool was used to assess nurses'intentions towards PU prevention and treatment where the response-option utilizes a 5-pointLikert scale. The tool composed of three subscales (IB, SN, PC, p. 111)

E. Barriers towards pressure ulcer prevention and treatment scale,developed and validatedbyMoore(2004), was used to measured barriers related to assessment, documentation and carrying out PU prevention and treatment practices. This allows respondents to rank the most important 3 barriers in each category of barriers.

Validity of Data

Four steps were taken to enhance the content validity of the study questionnaires.First, a relevant literature review was done with the purpose of choosing number of variables for the study that might influence nurses' knowledge, attitudes, and intentions towards PU prevention and treatment.Second, the content validity of the tools(PU Knowledge, attitudes, and intentions) for this study was conducted by a group of specialistsincluding nurse educators, experienced researchers, and a tissue viability nurses.Third, using of a triangulation research design. Fourth, the questionnaire was pre-tested in a pilot study.

Psychometric properties

Validity and Reliability.

The psychometric evaluation showed acceptablereliability and validity properties of PU Knowledge Tool.The tool was validated in terms of item difficulty, discriminating index, and quality of the response alternatives (Beeckman et al.,2010). The internal consistency reliability (Cronbach's α) was 0.77 and the 1-week test-retest intraclass correlation coefficient (stability) was 0.88.Content validity index (CVI) = 0.78–1.00.The item difficulty index of the questions ranged from 0.27 to 0.87, while values for item discrimination ranged from 0.29 to 0.65(Beeckman et al., 2010).

The PUAttitudesToolshas been used in previous studies and has shown acceptable psychometric properties (Bostrom& Kenneth, 1992; Hill, 1992; K¨allman &Suserud, 2009; Maylor & Torrance, 1999; Moore & Price, 2004).

For this study, test retest stability, CVI, and Cronbach's α were calculated. Content validity index was examined by a group of specialistswhiletest retest stability and Cronbach's α was statistically calculated using SPSS program.

Content validity refers to the degree to which an instrument has a suitable sample of items for the construct being evaluated (Polit & Beck, 2008). The literature, representatives of the relevant populations and the experts are key ways to getcontent validity (Burns and Grove, 2005).Specialistsincluding a nurse educator, an experienced researcher, and a tissue viability nursewere asked to rate each itemin the tool on a four-pointLikert Scale checklist (1= not relevant to 4= high relevant) in relation to relevancy, accuracy, adequacy, clarity, and representativeness.A detailed description about the checklist which was used as a guideline for the specialists and for calculating their rating responses isfound in appendix (9, p. 132).

The tools were found to be valid and reliable for the use with Jordanian nurses. The validity and reliability for the sample of the current study tools were illustrated in table 1.

Table 1.The psychometric properties of study tools

Scale	Psychometric properties		
	Test retest stability	CVI	Cronbach's α
PU Knowledge Tool	0.81**	0.83	0.78
PU Attitudes Tool	0.78**	0.90	0.82
PU Intentions Tool	0.76**	0.90	0.84

**Significant at the 0.01 level (2-tailed)

Educational Program

The educational programof 5-hours length per day for two days was divided into two sessions within each day. It was conducted by a tissue viability specialist nurse. It is composed of 3sections. The first section focused on understandingPU,outlines skin anatomy, the occurrence of PU and the impact they have on patients, healthcare providers, and the health care system. The second sectionfocused on risk assessment;describes the importance of assessing PU risks and outlines the use of risk assessment tools.The third section focused ondeveloping a prevention and treatment plan;describes strategies available to develop a risk prevention and treatment plan. For more details aboutthe PU educational program see appendix (8, p. 116).

The purpose of this programwas to clarify and introduce nurses to consistent PUprevention and treatment guidelines essential to care for patients in their clinical settings. The program assists in reducing or preventing PU. This program packages

alongside withan education and applicationtraining video tools,implements an effective PU prevention and treatment program and immediately reduces the incidence of healthcare-acquired PU.

In conclusion, the program lasted5 hour/ day for 2 days. Participants were asked to complete the post-test before leaving the sessions. They were reminded that they would be called to complete the third test approximately 3 months later on the basis of the literature(Tweed& Tweed, 2008) and to include their personal codes.

Data Collection Procedure

An invitation with a full description of the study was sent to thehospitals via Jordanian Nurses and Midwifery Council (JNMC). Thehospitals which agreed to participate were asked to send a list of their nurses' includingthose nurses who met the eligibility criteria and accepted participation. Nurseswere randomly selected and they were randomly assigned to the groups(experimental and comparison) from the received list. Before the beginning ofthe educationalprogram sessions, all participants including both experimental and comparison groups received an explanation about the research, the voluntary nature of their participation, a guarantee of anonymity, and a request to include a personal code of their choice on pre-test and survey to match with the post-test. The pre-education test (pre)was completed by the experimental and comparison groups' participants and collected at one time. Then the comparison group left without taking the educational program while the experimental group attended it. The experimental group did the post- test immediately after the educational program was completed. After three months, both groups,experimental and comparisonwere invited to complete the post- test to compare the results between and within the two groups. These data collection points illustrated in figure 4 (p. 33).

On the basis of the pilot study, thetime to complete the PU Knowledge Test was nearly 25 minutes estimated to be allowed for taking the actual tests used in the study. The participants were supervised by the researcher and were not allowed to use anyeducation access during the testtime. The total time to complete whole tools (PU Knowledge Test, demographic, attitudes, and intentions) was 35 minutes.The post- test was conducted 3 months after completing the education program. Nurses were asked to enter their staff personal code numbers on the test response sheets, enabling paired analysis while maintaining confidentiality. The researcher had no means of identifying individual staff members on the basis of the code numbers.The investigatormarked all the tests by the researcher.

The procedures of data collection are illustrated in Figure 4 (p. 33).

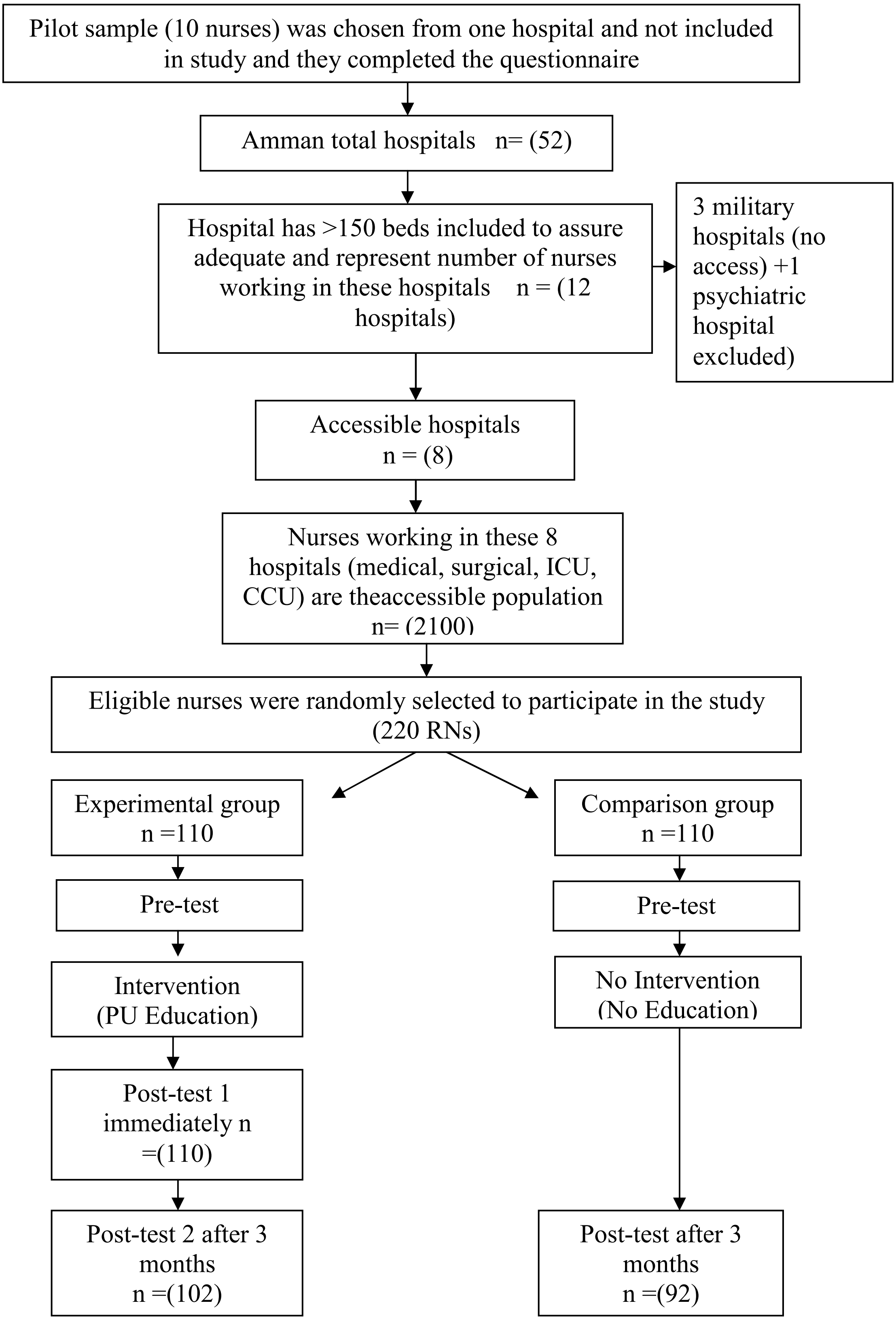


Figure 4.Study Sampling and Data Collection Points

Ethical Considerations

The proposal was reviewed by the Ethics Committee of the Faculty of Nursing at the University of Jordan. Approval from intended hospitals, IRB, and subjectswas gained. Several strategies were utilized to protect the participants' rights. First, written consent from the participants was obtained prior to the enrollment. The participants were informed of the purpose of the study, that their participation was voluntary, and that they had the right to refuse to participate. Participants were also informed that they could withdraw their data at any pointduring or after the study.

Anonymity of the participants maintained at all times. Data was organized by participants' codes.Datawas secured correctly, saved in the researcher's password-protected computer, with hard copies in a cabinet in a locked office.The names and addresses of the participants remained unknown to investigator.In order to guarantee the participants' privacy, there was no information collected that could reveal their identities.

Permission to use the tools in the study was taken from both developers of the Knowledge Test Tool and Attitudes tool and PU survey via e-mail. A copy of the email messages attached in the appendices (Appendices 6 & 7, p. 114, 115).

Pilot study

A pilot study conducted to offer more confirmatory study and help to achieve other aims using small study (Arnold, Burns, Adhikari, Kho, Meade, & Cook, 2009). A pilot studyis conducted to assess : (1) feasibility, (2) adequacy of instrumentation, (3) data collection strategy problems and proposed methods, (4) answering methodological questions, (5) planning a larger study(Prescott &Soeken, 1989), and (6) for obtainingadequate preliminary data in preparation for submitting a grant (Jairath,

Hogerney, & Parsons, 2000). When conducting a pilot study, researchers need to be clear about its purpose (Arain et al., 2010).

Access to nurses to carry out a pilot study was via the Director of Nursing at a hospital. The survey and test were circulated to 20 staff nurses to assess usability of the test and the scoring scheme. The completed survey and test were received.Feedback was obtained on a variety of aspects of the survey and test, including clarity and layout, possible ambiguities, time taken to complete the test,possible needs for translation and back translation and coding of answers for data analysis.Subjects did not have any problems with the wording, length and format of the questionnaire. The data collected during the pilot were not included as part of the main study.

Data Analysis Plan

Statistical analyses were performed using SPSS 15.0 (SPSS Inc., Chicago, IL, USA).Descriptive statistics used to draw summary measures of central tendency and frequencies for demographic items.

The following inferential statistical tests were used:

1. Correlation between items measured by using Pearson's test, spearman, and chi-square as appropriate.
2. The first's research question (Is there a difference innurses' knowledge, attitudes, andintentionstowardsPU preventionand treatmentbased on their demographic variables) answered using *t* test to compare scores of nurses'knowledge, attitudes, andintentionstowards PU preventionand treatment, between the two levels variables (gender, level of higher education, and previously involved in PU research) and Analysis of Variance (ANOVA)test to compare the three or more levels variables(age,sources of education on PU, clinical experience years).

3. The secondresearch question(What is nurses' knowledge, attitudes, and intentionson PU prevention and treatment?)was answered by calculating the total and/or mean scores obtained from completing the PU Knowledge test by both groups (the experimental group compared to thecomparison group) before initiating the educational program.
4. The thirdresearch question(What arenurses' perceived barriers towards PU prevention and treatment?)was answered by calculating the frequecy and percentage of the higher three nurses perceived barriers as ranked by nurses.
5. *t*-tests for independent groups were used to test the difference between two independent group means (experimental group compared withcomparison group)and to test the researchquestion number 4. The normality and homogeneity assumptions tested and were satisfied.
6. Paired t-tests were used to test the differences between the two related groupmeans (pretest, post-test for the experimental groupto test the researchquestion number 4).
7. Analysis of Variance (ANOVA), with repeated measures using an alpha significance level of .01 to measured the overall and interaction effects.

Qualitative Approach

Introduction.

To enhance the rigor of the study results,to expand results, and to find outthe unseen information pieces if only a quantitative approach had been used, a qualitative approach was conducted utilizing a focus group method. This help in the interpretation of gaps or contradictory results between nurses' knowledge and practicessince there are often major differences between what people say and what they do. This method can improve data and give insights into how findings work and how findings can be translated to practice in addition to richer understanding.Furthermore, a triangulation method ruling out rival explanations andprovide more valid evidencefor results.Nurses who participated in the focus group were not included in the quantitative study.

A qualitative approach utilizing focus group method was undertaken with eight RNs, with the aim of exploring their knowledge, views, beliefs and barriersabout PU prevention and treatment.The focus group method, a somewhat informal technique, was selected as the most appropriate method for understanding nurses'knowledge, views, and experiences (Krueger & Casey, 2000).

The focus groupis used in program evaluation when the objective is to gain a detailed understanding of participants' experiences, opinions, and thoughts.This approach is advantageous because interactions between participants produce information that would not otherwise be revealed in individual manner and because participants' interactions and discussions contribute to data analysis (Krueger & Casey, 2000).The focus groupis a popular method for assessing health education and examining understandings of illness and of health behaviors.They are widely used to examine people's experiences of disease and of health services and are an effective technique for exploring the attitudes and needs of staff (Speziale & Carpenter, 2007).

Qualitative Technique

By the qualitative technique, the focus group method was undertaken with eightRNs with the aim of exploring their knowledge, views, beliefs and barriers around PU prevention and treatment. Participantswere recruited via phone, email, or contact person. Names, addresses, emails and phone numbers were taken from the nursing director. First, a preliminary letter outlining the purpose of the research and indicating that participants receive some form of payment for their time and their expenses was seat.The researcher'semail address was sent so that they could email any information requested. Lastly, calls were made to participants to ensure they were still able to participate.

Sample Size and Characteristics

Usually in a focus group, seven to ten participantsare used to give the chance for each participant to express his or her views and give everyone the opportunity to express an opinion(Speziale & Carpenter, 2007). Also, a small size group is preferable when the participants have a great deal to share aboutthe topic or have had intense or lengthy experiences with the topic ofdiscussion (Krueger & Casey, 2000).Krueger andCasey stress the importance of homogeneity which means that the participants have something in common that you are interested in. The focus group should be homogenous but with a variety of participants that allows contrasting opinions. In general there are at least two reasons are concerned about homogeneity. One is for analysis purposes and the other isfor the participants' comfort.The degree towhich sharing is influenced by differences is in the participants'characteristics (Krueger & Casey, 2000).

The sample size for the focus group for the current study was eight nurses. The nurses selected purposively. Nurses who have experience in caring for patients with

PU and have interest in participating in the discussion on PU prevention and treatment were selected.

Krueger and Casey (2000) pointed out that the focus group method is intended to make a group of people with specific attributes provide qualitative data related to the research topic in a comfortable environment, under the guidance of a moderator, and through group discussions. In other words, a focus group is a special group with a specific intention, in a specific composition, and required to complete a certain process (Krueger & Casey, 2000).

Data CollectionInstrument and Procedure

Semi-structured focus group guidelineswere developed to assess participants' knowledge, views,beliefs, and perceived barriersrelated to PU prevention and treatment.Semi-structured tape-recordeddiscussions were conducted. Before the interviews started, a list of sensitizing concepts was formulated. These conceptswere based on literature focusing on knowledge,behavior,and research utilization with regard to PU prevention and treatment, and influencing factors.The list of sensitizing concepts was used during the discussion. The diffusion of knowledge of PU prevention and treatment into practice was one of the concepts. The participants were asked how they got informed about new nursing issues and knowledge and how they were informed about PU prevention and treatment. They were also asked how they view and deal with changes focusing on such nursing issues as PU prevention and treatment. Next, the discussion focused on the personal view of the participants on activities focusing on PU prevention and treatment. The participantswere asked about the methods used to prevent and treat PU and the arguments for choosing these methods. In addition, motives for using or not using a PU prevention and treatment protocol were also discussed.

The focus groupis typically recorded in two ways: by a tape recorder and withwritten notes. Written notes are essential and should be as complete aspossible in case the tape recorder doesn't work. The tape-recordingequipment and remote microphone were set before the meeting began and in plainsight of participants (Krueger & Casey, 2000).

Rigors

To validate the findings, determine the credibility of the information and whether it matches reality, four primary forms were used in the qualitative phase of the study: (1) triangulation – converging different sources of information (interview, documents, notes); (2) member checking – getting the feedback from the participants on the accuracy of the identified categories and themes; (3) providing rich, thick description to convey the findings; and (4) external audit – asking a person outside the study to conduct a thorough review of the study and report back (Speziale & Carpenter, 2007).

Ethical Consideration

All participants were asked for their agreement to participate and give permission for the interview to be tape-recorded. The discussiontook place in a quiet available room with only the researcher, note taker, and the participants. Participants were informed that participation in the study was voluntary, they could withdraw from the study at any time and information given will be treated with anonymity and confidentiality.Confidentiality was assured by using pseudonyms instead of participants' actual names in reporting of the findings.At the end of the study, all tapes were destroyed.

Data Analysis Plan

Focus group analysis is a deliberate, purposeful process. It is systematic, usesverifiable procedures, is done in a sequential manner, and is a continuingprocess (Krueger & Casey, 2000). The analysis is better done by someone who was physicallypresent in the room when the focus group was conducted. It has been estimatedthat 80% of content is found in the transcript, and the remaining 20% areall the other things that occur in the room. In some groups, the environmentmust be sensed and felt (Krueger & Casey, 2000).

Analytic strategies involved transcript-basedthemes were performed according to stepsoutlined by Krueger and Casey(Krueger & Casey, 2000). Data analysisinvolved developing initial categories and thenrepeatedly analyzing transcripts to build themes.The discussionwas transcribed providing rich and thick description to convey the findingsand sent to the participants who were given the chance to clarify unclear text fragments.

Krueger and Casey (2000) emphasized toconsiderthe following when analyzing focus group data:

- Words:actual words used by the participants and the meanings of thosewords.
- Context:examine the context by finding the triggering stimulus and then interpret the comment in light of that environment.
- Internalconsistency: when there is a shift in opinion, the researcher typically traces the flow of the conversation to determine clues that might explain the change.
- Frequency orextensiveness: these topics could be more important or of special interest to participants.

- Intensity: occasionally participants talk about a topic with a special intensity or depth of feeling.
- Specificity:responses that are specific and based on experiences should be given more weight than responses that are vague and impersonal
- Findingbigideas:step back from the discussions by allowing an extra day for big ideas to percolate.

Analysis Strategy:

1. Prepare your transcripts for analysis.
2. Make two copies of each transcript.
3. Arrange transcripts in an order
4. Read all transcripts at one sitting.
5. Prepare large sheets of paper.
6. Cut and tape.
7. Write a statement about the question.
8. Continue until all transcripts are reviewed.
9. Take a break.
10. Prepare the report.

CHAPTER FOUR

Results

Results of Quantitative Part

The purpose of this study is to assess and examine the influence of using a PU educational program on nurse’s knowledge, attitudes, andintentions towards PU prevention and treatment.A sample of 194 nurses who met the inclusion criteria was chosen from nurses working in different hospitals in Amman, Jordan.

Descriptive and inferential statistics were used to analyze the data. Descriptive statistics were used to describe the characteristics of the participants.Theinferential statistics were used to analyze the effects of the educational program and nurses' demographics on nurses’ knowledge of PU, attitudes, andintentions towards PU prevention and treatment.

Participants' Characteristics

The sample consisted of 194 eligiblenurses who provided direct bedside care for patients. A list of selected participants was used to distribute the questionnaires to the experimental and comparison groups. The participants were working in different nursing wards or units which usually care for patients at risk or/and having PU.

Participants were randomly assigned to two groups, the experimental group and the comparison group. The total number of participants who completed the post-test questionnaires was 194.

The Statistical Package for Social Science (SPSS Inc., Chicago, IL, USA) was used to analyze the data. Table 2 shows demographic details of the sample. The majority of the sample were males (n = 114, 58.8 %), while females nurses were41.2% (n = 80). Their ages ranged from 22 to 40 years old. The mean age was 27.3 years (SD

= 3.47, range = 22-40). The age of most nurses was between 26 and 30years (n =99, 51.0%). Also, the majority had bachelor degree (n =171, 88.1 %) while other nurses had Master degree (n=23, 11.9%). About 35.6% (n =69) of the nurses reported that they had not received training or education about PU prevention. One hundred eighty- two of the nurses (n=182, 93.8 %) who participated in this study had less than ten years ofclinical nursing experience. Eighty-ninenurses (45.9%) had less than four years while 93 (47.9%) had five to ten years of clinical nursing experience. The majority of the nurses, one hundred sixty-three(84.0%), had not previously participated in PU research.

Table 2.Demographic characteristics of nurses (N=194)

Variable		Total N=194	Group	
			Experimental(N=102)	Comparison(N=92)
		n	n (%)	n (%)
Gender	Male	114	63(61.8)	51(55.4)
	Female	80	39(38.2)	41(44.6)
Age	20-25 years	67	45(44.1)	22(23.9)
	26-30 years	99	38(37.3)	61(66.3)
	31-35 years	25	17(16.7)	8(8.7)
	36-40years	3	2(2.0)	1 (1.1)
Current Higher Degree	Bachelor	171	89 (87.3)	82 (84.8)
	Master	23	9 (8.8)	14 (15.2)
Nursing clinical Experience	1-4 years	89	42(41.2)	47(51.1)
	5-10 years	93	50(49.0)	43(46.7)
	11-15 years	1	1 (1.1)	1(1.1)
	16-20 years	1	9(8.8)	1(1.1)
Source of PU Education	University	111	50(49.0)	61(66.3)
	In-service training	38	20(19.6)	18(19.6)
	Degree plus in-service training	15	6(5.9)	9(9.8)
	Conference	11	5(4.9)	6(6.5)
	Product promotion	11	7(6.9)	4(4.3)
PU research	Yes	31	23(22.5)	8(8.7)
	No	163	79(77.5)	84(91.3)
Last Attend Training on PU	Less than 1year	78	49(48.0)	29(31.5)
	1-2 year	14	6(5.9)	8(8.7)
	More than 2 year	28	12(11.8)	16(17.4)
	Never attended	69	35(34.3)	34(37.0)

Nurses' knowledge, attitudes, intentions and their demographic variables

The first research question was,“Is there a difference innurses' knowledge, attitudes, and intentionstowardsPUprevention and treatment based on their demographic variables?”

Nurses' Gender.

The results showed a statistically significant differences between the mean scores of nurses' knowledge and nurses' gender(*t*=2.33, *P*=0.021).Male nurses had higher scores of PU knowledge test (M= 11.4, SD=2.2, range= 7-17) compared tofemale nurses (M= 10.5, SD=2.1, range= 5-15)(Table 4).In contrast, female nurseshad higher scores ofnurses'intentions(M= 14.2, SD=3.0, range=7-21)towardsPU preventionand treatmentcompared tomale nurses (M= 11.2, SD=3.0, range=6-18).

The results showed statisticallysignificant differences between the mean scores of nurses' intentions and nurses' gender (*t*=-3.77, *P*=0.001)(Table 6).On the other hand, there was nostatistical significantdifference between nurses'attitudesand gender (*t*=-1.24, *P*=0.21).But female nurseshad higher mean scores ofnurses'attitudes (M= 35.0, SD=3.6, range=28-42)towardsPU preventionand treatment compared tomale nurses (M= 34.1, SD=4.0,range=25-46)(Table 5).

Nurses' Age.

Using ANOVA test to study the differences inthe mean scores, the results showed no statistical significant differences among nurses' knowledge(F=1.12, *P*=0.13), attitudes (F=0.29, *P*=.82), and intentions(F=0.72, *P*= 0.53) towards PU preventionandtreatment and nurses' ages (Table 4, 5, 6).There was a slight increase in the mean scoresof nurses' knowledgeafter the age of 35 years (M= 12, SD= 1.4) compared to other age groups(M= 11.4, 10.7, 11.6, SD= 2.0, 2.1, 2.6respectively).

Nurses' Educational Level.

The *t*-test was used to study the differences inthe mean scores of nurses' knowledge, attitudes and intentions towards PUpreventionand treatment and their educational level.The results showed no statistical significant differences between the mean scores of nurses' knowledge (t=-1.25, P= 0.21),attitudes (t=-0.58, P=0.80),and intentions(t=-0.22, P=0.66) towards PUpreventionand treatmentand nurses' educational level.

Nurses who had a Master degree had slightly higher mean scores of PU knowledge(M=11.4, SD= 2.7), attitudes(M=35.5, SD= 3.0), and intentions(M=12.7, SD= 2.2)towards PUpreventionand treatmentcompared to nurses who had a bachelor's degree (M= 10.6, 34.9, 12.5, SD= 2.0, 3.8, 3.2respectively)(Table 4, 5, 6).

The sample had 23(11.9%) Master degree nurses while the bachelor's degree nurses were 171(88.1%).

Nurses'Experience.

The results showed that nurses with less than 2 years of experience had the lowest mean scores of attitudes (M=34.7, SD=1.7) and intentions(M= 10.4, SD= 2.6) and had higher mean scores of knowledge(M= 11. 4, SD= 2.0)towards PUpreventionand treatment. Nurseshaving 11to15 years had the highest mean scores ofattitudes (M= 39) and intentions(M=18) towards PUpreventionand treatment. Furthermore,the ANOVA test showed that there were statistically significant differences between years of experience and attitudes (F=4.36, P= 0.006) and intentions(F=4.22, P=0.007) towards PUpreventionand treatment.In contrast, the results showed no statistical differences between nurses' knowledgetowards PUpreventionand treatmentand nurses' clinical experience years (F=.41, P=0.662)(Table 4, 5, 6).

Sources of PU Education.

The results showed no statistical differences on PU knowledge related to sources of education (F=1.00, *P*= 0.42).On the other extreme, the results showed that the sources of education had a statistically significant differences on nurses' attittudes (F=2.99, *P*=0.009) and intentions(F=3.72, *P*=0.002) towards PUpreventionand treatment. Product promotion had the lowest mean scores of intentions(M= 10.3, SD= 3.2)towardsPUpreventionand treatmentwhile conference had the highest mean score (M= 17.2, SD= 2.7)(Table 4, 5, 6).

Results present in table 3 revealed that most of the nurses (51%) did not receive any type of education on PU after graduation from the university. In-service training is the second source of education on PU (32%) after university.

Table 3.Sources of PU preventioneducation (N=194)

Sources of pressure ulcer preventioneducation	Number (%)
Total number of respondents	194(100)
University	99(51.1)
In-service training	50(25.9)
In-service training plus degree	13(6.7)
Product promotion	11(5.9)
Conference	7(3.7)
Other	4(2.2)

Involvement in PUResearch.

Using *t*-test to study the differences inthe mean scores of nurses' knowledge, attitudes and intentions towards PUpreventionand treatment, the results showed no statistical significant differences between the mean score of nurses' knowledge(*t* =1.79, *P*=0.075),attitudes(*t* = 1.08, *P*=0.28) and intentions(*t* =1.80, *P*=0.73) towards PUpreventionand treatmentand nurses' involvement in previous PU research.

Nurses who hadbeen involved in PU research had higher mean scores of PU knowledge(M=10.8, SD= 2.2), attitudes (M= 35.1, SD= 4.7) and intentions(M= 12.7,

SD= 3.5)towards PUpreventionand treatment,compared to nurses who hadnot beeninvolved in PU research (M=9.9, SD= 2.1, M= 34.1, SD= 3.6,and M= 10.8, SD= 3.0respectively). Only 31 (16%) nurses had been involved in PU research (Table 4, 5, 6).

The Last Attended Training on PU Prevention and Treatment.

Using *t*-test to examine the differences inthe mean scores of nurses’ knowledge, attittudes and intentions towards PUpreventionand treatment, the results showed no statistical significant differences between the mean scores of nurses’ knowledge(F=1.42, *P*=.23),attittudes (F=2.09, *P*=0.086) and intentions(F= 0.91, *P*=0.45) towards PUpreventionand treatmentand nurses' last attended training on PU (Table 4, 5, 6).

Table 4.Differences between participants' characteristics and their knowledge towardsPUpreventionand treatment(N=194)

Nurses' Characteristics		n	M	SD	t-test	ANOVA	P-value
Gender	Male	114	11.4	2.2	2.33		0.021*
	Female	80	10.5	2.1			
Age	20-25 years	67	11.4	2.0		1.12	0.13
	26-30 years	99	10.7	2.1			
	31-35 years	25	11.6	2.6			
	36-40years	3	12.0	1.4			
Current Higher Degree	Bachelor	167	10.6	2.0	-1.25		0.21
	Master	23	11.4	2.7			
Nursing clinical Experience	<2year	10	11.4	2.0		0.41	0.66
	2-4 years	89	11.4	1.7			
	5-10	93	10.7	2.6			
	11-15	1	10.0				
	16-20	1	11.0				
Source of PU Education	University	111	11.4	2.2	1.0		0.42
	In-service	45	11.0	1.8			
	Conference	6	10.2	2.6			
	Product pro	11	10.3	1.5			
	other	4	11.0	0.0			
PU research	Yes	23	10.8	2.2	1.79		0.075
	No	125	9.9	2.1			
Last Attend Training on PU	<1year	78	10.7	2.3		1.42	0.23
	1-2 year	14	11.1	2.5			
	> 2 year	28	11.4	1.7			
	Never	69	11.4	2.1			

*Significant at the 0.05 level (2-tailed)
**Significant at the 0.01 level (2-tailed)

Table 5.Differences between participants' characteristics and their attitudes towardsPUpreventionand treatment(N=194)

Nurses' Characteristics		n	M	SD	t-test	ANOVA	P-value
Gender	Male	114	34.1	4.0	-1.2		0.21
	Female	80	35.0	3.6			
Age	20-25 years	67	34.5	3.9		0.29	0.82
	26-30 years	99	34.5	4.1			
	31-35 years	25	34.0	2.9			
	36-40years	3	36.5	2.1			
Current Higher Degree	Bachelor	167	34.9	3.8	-0.58		0.80
	Master	23	35.5	3.0			
Nursing clinical Experience	<2year	10	34.7	1.7		4.3	0.006**
	2-4 years	89	35.4	4.2			
	5-10	93	33.4	3.3			
	11-15	1	39.0	0.0			
	16-20	1	38.0	0.0			
Source of PU Education	University	111	34.2	3.7		2.99	0.009**
	In-service	45	34.2	2.1			
	Conference	6	34.8	2.6			
	Product pro	11	35.3	3.2			
	other	4	34.0	3.5			
PU research	Yes	23	35.1	4.7	1.08		0.28
	No	125	34.1	3.6			
Last Attend Training on PU	<1year	78	34.9	3.4		2.09	0.086
	1-2 year	14	35.5	4.2			
	> 2 year	28	35.8	4.5			
	Never	69	33.4	3.6			

*Significant at the 0.05 level (2-tailed)
**Significant at the 0.01 level (2-tailed)

Table 6.Differences between participants' characteristics and their intentions towardsPUpreventionand treatment(N=194)

Nurses' Characteristics		n	M	SD	t-test	ANOVA	P-value
Gender	Male	114	11.2	3.0	-3.77		0.001**
	Female	80	14.2	3.0			
Age	20-25 years	67	13.3	3.3		0.72	0.53
	26-30 years	99	12.3	3.0			
	31-35 years	25	11.5	3.0			
	36-40years	3	13.5	2.1			
Current Higher Degree	Bachelor	167	12.5	3.2	-0.22		0.66
	Master	23	12.7	2.2			
Nursing clinical Experience	<2year	10	10.4	2.6		4.22	0.007**
	2-4 years	89	12.7	2.9			
	5-10	93	12.6	3.4			
	11-15	1	18.0	0.0			
	16-20	1	12.0	0.0			
Source of PU Education	University	111	12.4	2.9		3.72	0.002**
	In-service	45	12.7	3.0			
	Conference	6	17.2	2.7			
	Product pro	11	10.3	3.2			
	other	4	11.0	1.4			
PU research	Yes	23	12.7	3.5	1.80		0.73
	No	125	10.8	3.0			
Last Attend Training on PU	<1year	78	12.6	3.2		0.91	0.45
	1-2 year	14	10.8	2.6			
	> 2 year	28	13.4	3.2			
	Never	69	12.6	3.2			

*Significant at the 0.05 level (2-tailed)
**Significant at the 0.01 level (2-tailed)

Participants' characteristics between experimental and comparison groups before implementing the educational program

The experimentaland the comparison group were divided (102 nurses in experimentalgroup and 92 nurses in comparison group). Non parametric tests used since the variables at nominal and ordinal level. Chi square for nominal level variables(gender, previous PU research involvement, and sources of PU education), Mann-Whitney for ordinal with two levels variable (higher degree) and Kruskal–Wallis for ordinal with three or more levels variables (age, clinical experience, and last attended training)tests were used to analyze if there were significant differences between the experimentaland the comparison groups before conducting the educational program. The level of significance was 0.05.

The results of analysis as seen in table 7 showed that there were no significant differences between the two groups. The absence of differences of participants' characteristics between experimentaland comparison groups before implementing the educational program made them comparable. So, the differences of the post test could be inferred to the influence of PU educational program on nurses' knowledge, attitudes, andintentions towards PUpreventionand treatment.

Table 7.Analysis of differences of participants' characteristics between experimental and comparison groups before implementing the educational program (N=194)

Variable		Group		*P*value
		Experimental (N=102)n (%)	Comparison(N=92) n (%)	
Gender	Male	63(61.8)	51(55.4)	0.10
	Female	39(38.2)	41(44.6)	
Age	20-25 years	45(44.1)	22(23.9)	0.21
	26-30 years	38(37.3)	61(66.3)	
	31-35 years	17(16.7)	8(8.7)	
	36-40years	2(2.0)	1 (1.1)	
Current Higher Degree	Bachelor	89(87.3)	78(84.8)	0.65
	Master	9(8.8)	14(15.2)	
Nursing clinical Experience	1-4 years	42(41.2)	47(51.1)	0.51
	5-10 years	50(49.0)	43(46.7)	
	11-15 years	1 (1.1)	1(1.1)	
	16-20 years	9(8.8)	1(1.1)	
Sources of PU Education	University	50(49.0)	61(66.3)	0.18
	In-service	20(19.6)	18(19.6)	
	Conference	6(5.9)	9(9.8)	
	Product pro	5(4.9)	6(6.5)	
	Other	7(6.9)	4(4.3)	
PU research	Yes	23(22.5)	8(8.7)	0.08
	No	79(77.5)	84(91.3)	
Last Attend Training on PU	<1year	49(48.0)	29(31.5)	0.81
	1-2 year	6(5.9)	8(8.7)	
	> 2 year	12(11.8)	16(17.4)	
	Never	35(34.3)	39(52.4)	

*Significant at the 0.05 level (2-tailed)

Nurses' knowledge, attitudes, and intentions towards PU prevention and treatment

The second study question was,“Whatarenurses’knowledge and attitudes towards PU prevention and treatment?"

Nurses'PU knowledge

The PU Knowledge Test developed by Beeckman (2009) was used to measure nurses'knowledge on PU prevention and treatment.The PU Knowledge Test was ranged (0 -26). The pretest scores of the PU Knowledge Test were calculated for the nurses who participated in the study (N=194).A50% cut-off point (answering 13 out of 26 items of the PU knowledge test correctly) was used to identify nurses' PU knowledge.

The mean scores of the test for all participants was 10.84 out of 26 (SD = 2.3, range= 5-17). About 142 (73%) of nurses didnot pass the test cut off passing score 13 (50%).About52 (27 %) didpass the test (range 13 to 17, [out of 26]). This indicates that the majority (73 %) of nurses had inadequate knowledge about PU prevention and treatment. The mean scores (M=10.84 out of 26, SD = 2.3, range= 5-17) of nurses' knowledge towards PUprevention and treatmentsignify the need for national educational programs to improve nurses' knowledge.

Nurses’ attitudes towards PU prevention and treatment

The AttitudesScale was ranged (11 -55).Attitudes ranged from mild (less than 30%), medium (31% - 60%), and high(above 60%). In the current study nurses demonstrated positive attitudes towards PUprevention and treatment (M=35, SD=3.8,range 25–46). Thirty-five per cent of nurses felt that all patients are at risk of developing PU, that most PU can be avoided (68%) and nurses should concern themselves with PU prevention (56%).

Pressure ulcer prevention was seen as more important than PU treatment (50%) and regular (60%) and continuous assessment (87%) was considered an accurate method for obtaining a picture of patients' risk status. There was a broader range of responses related to other factors. For example, 35% of the nurses felt that prevalence rates are decreasing whilst only 30% felt that they were increasing. Thirty-four per cent of nurses felt that PU prevention is time consuming to carry out while50% felt that PU prevention is a priority. Sixteen percent admitted to being less interested in PU prevention than in other aspects of nursing care. Thirty-five per cent of the nurses felt that their clinical judgment was better than any available pressure ulcer risk assessment tool.

Nurses' perceivedbarriers towards PUprevention and treatment

The third study question was,"What arenurses' perceived barriers towards PU prevention and treatment?"

Barriers towards PU prevention and treatment were measured using list of barriers related to assessment, documentation and carrying out PU prevention and treatment practices. Participants were requested to rank the most important 3 barriers in each category of barriers.The most commonly cited possibilities were lack of time, short staff, the patients' condition and lack of resources or lack of equipment.

Potential barriers to carrying out PU risk assessment, PU documentation and PUprevention and treatment are presented in Tables 8,9and 10. 'The short staff and lack of time' was the most frequently cited barriers to carrying out PU risk assessment (48.1%), along with documentation (56.3%) and prevention (39.2%).Barriers related to patient took the third rank, after staff and time.For example, the patient may be too ill to be assessed or may be uncooperative, making assessment difficult. Lack of training and lack of aids were also perceived as important barriers. However, lack of

knowledge was mentioned as least important barrier to carrying out PU risk assessment, documentation and prevention.

Table 8.Barriers to carrying out PU risk assessment (N=194)

Barriers to carrying out PU risk assessment	Number (%)
Total number of respondents	194 (100)
Short staffed	33 (24.4)
Lack of time	32 (23.7)
Lack of training, resources, equipment, guidelines	26 (19.3)
Patient un-cooperative/too ill	20 (14.8)
Lack of equipment	18 (13.3)
Unstable patient	17 (12.6)
Lack of knowledge	13 (9.6)
Problems with assessment tool	9 (6.7)
Unable to assess	9 (6.7)

Table 9.Barriers to carrying out PU documentation (N=194)

Barriers to carrying out PUdocumentation	Number (%)
Total number of respondents	194 (100)
Lack of time	46 (34.1)
Short staffed	30(22.2)
Problems with assessment tool	21(15.6)
Unstable patient	16(11.9)
Lack of aids	15(11.1)
Lack of knowledge	14(10.4)
Forget	13(9.6)
Lack of equipment	10(7.4)

Table 10.Barriers to carrying out PU prevention and treatment (N=194)

Barriers to carrying out PUprevention and treatment	Number (%)
Total number of respondents	194 (100)
Lack of time	33(24.4)
Unstable patient	24(17.8)
Lack of training, resources, equipment, guidelines	22(16.3)
Short staffed	20(14.8)
Lack of knowledge	19(14.1)
Other aspects of care more important/lack of continuity	16(11.9)
Lack of aids	14(10.4)
Unable to assess	13(9.6)

Effects of educational program on nurses'knowledge, attitudes, and intentions towards PU prevention and treatment

The fourth study research question was, "Will an educational program on PU improve nurses' knowledge, attitudes, and intentions towards the prevention and treatment of PU."

Effects of educational program on nurses'knowledge

Questions were scored according to the following score: correct = 1, other answers = 0, and I don't know =0. The possible range of scores was 0 to 26. The points for correct/incorrect answers were summed for a total score, and means were tested within groups (before-after test administration) and between groups (experimental and comparison). The distribution of the summed scores within and between the groups was adequately homogenous and normally distributed around their means.

Mean scores by experimental and comparison groups for the 3 time periods are presented in Table 11. Total correct scores forexperimental group on the 26-item of the

PU knowledge test ranged from 5to17(19.2% - 65.3%)for the pre-test, from 8to 21(30.7% -80.7%) for post-test1, and from 7to 18(26.9% -69.2)for post-test 2. Total correct scores for comparison group for the pre-test were between 5 to17 (19.2% - 65.3%), andwere between9 to15 (34.6% - 57.6%) for post- test.

The mean nurses' PU knowledgescores of pre- tests ofexperimental group was10.8(41.5%) and for comparison group was11.4 (55.3%). Independent *t*-test revealed no statistical significant difference between the two groups on the pre-test scores (t=1.65, P=0.10). On the other hand, the experimental group mean nurses' PU knowledgescores of post-test1(M=15.2,SD=2.6, range=8-20) was higher compared to the pre-test (M=10.8,SD= 2.0, range=7-16)after the educational program.There was a statistically significant difference between the mean pre and post-test scores of nurses' PU knowledge of the experimental group (t=-16.7, P<0.001)after the educational program (Table 12). Furthermore, there was a significant difference showed by the significant correlation (r=0.5, P<0.001) between the pre-test and post-test 1 scores of the experimental groupafter the educational program.

The mean nurses' PU knowledge test scores dropped down after 3 months of conductingthe educational program from (M=15.2,SD=2.6, range=8-20) in post-test 1 to(M=13.6, SD=2.5, range=8-18) in post-test 2.Comparison was calculated to test the differences between the pair of means at an alpha level of 0.01 for post 1 and post 2 of experimental group scores. The results showed that scores, collapsed over the time, for the post-test 1 and post-test 2,were still significantly higher compared to scores for the pre-test (t = -5.47, P<0.001)(Table 12). However, scores of the experimental group decreased significantly from post-test 1 (M= 15.2,SD= 2.6, range= 8-20) to post-test 2 (M=13.6, SD= 2.5, range= 8-18) (t= 7.54, P<0.001)(Table 12).

Table 11.Experimental and comparison groupsmean knowledge scores* (N=194)

PU Knowledge Test	Groups							
	Experimental (n=102)			Comparison (n=92)				
	n	Mean	SD	n	Mean	SD	*t*	*P* value
Pre-test	102	10.8	2.05	92	11.4	2.35	1.65	0.10
Post-test 1	102	15.2	3.17					
Post-test 2	102	13.2	2.50	92	11.6	1.80	-4.95	<0.001**

*Includes all participants completing questionnaires at each of the 3 times.
**Significant at the 0.01 level (one tailed)

Table 12.Differences between pre and post PU knowledge test for experimental and comparison groupspaired *(N=194)

Group			Paired *t* test	
			t	*P* value
Experimental (n=102)	Pre-test	Post-test 1	-16. 7	<0. 001**
Experimental (n=102)	Post-test 1	Post-test 2	7.54	<0. 001**
Experimental (n=102)	Pre-test	Post-test 2	-5.47	<0.001**
Comparison (n= 92)	Pre-test	Post-test 2	-.65	.51

*Includes all participants completing questionnaires at each of the 3 times.
**Significant at the 0.01 level (one tailed)

A 2x2 ANOVA with repeated measures was calculated for RNs who completed the PU Knowledge pre-test and post-test 2 tests. Mean knowledge scores for these groups were: pre-test(M=10.8,SD= 2.0, range=7-16) and post-test2 (M=13.6, SD=2.5, range= 8-18) for the experimentalgroup whiles the pre-test(11.4, SD = 2.3, range= 5-17) and post-test2 (11.6, SD = 1.8, range= 7-16) for the comparison group. Furthermore, the overall effect was statistically significant (F=32.9, *P*<0.001).

The post-test 2was completed by the experimentalgroup (n= 102) and the comparison group (n=92).Eighteen nurses from the comparison group did not complete the post- test 2 questionnaire. Eight nurses withdrew voluntarily from the study. The differences in mean scores between the experimentaland comparison groups can be shown in figure 5.

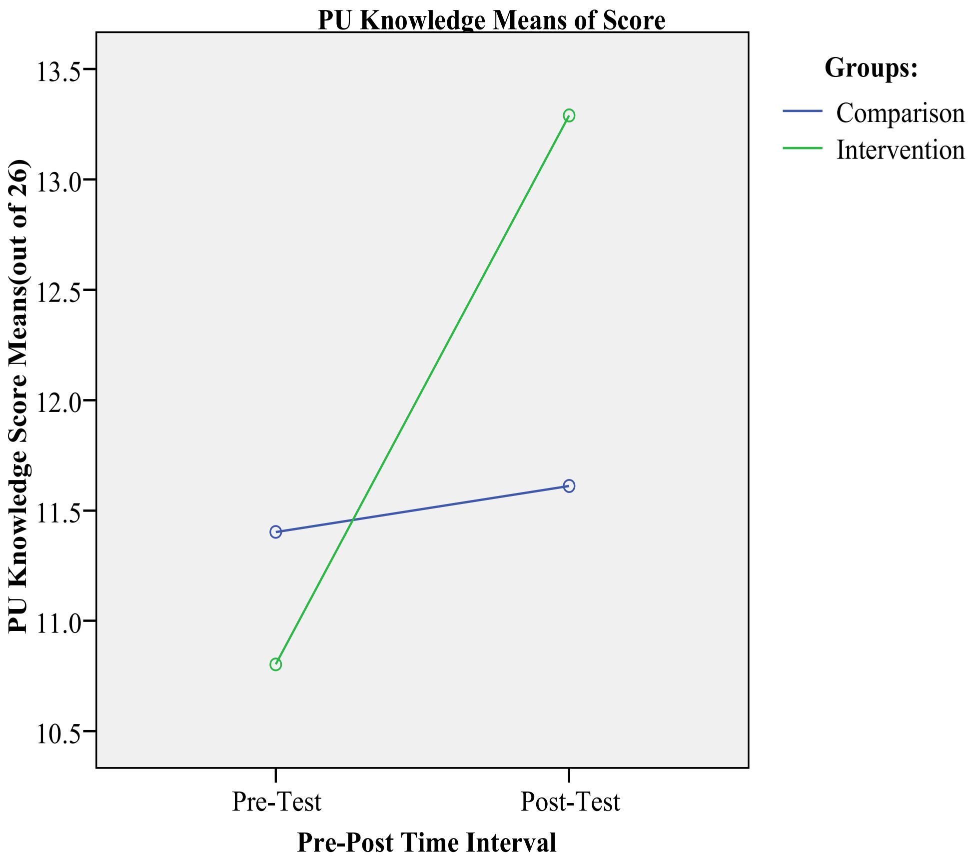


Figure 5. Differences between PU Knowledge Pre-test and Post-test mean scores for experimentaland comparison groups

Figure (5) showed statistically significant increase in nurses' PU Knowledge scores for the experimentalgroup while there was no significant increase in scores of the comparison group. Repeated measure analysis of variance was used to examine the main effect of educational program on nurse's knowledge towards PU prevention and treatment. The results showed that there were statisticallysignificant differences in

mean scores of nurses'knowledge towards PU prevention and treatment between the experimentaland comparison groups (F = 32.9, *P*<0.001) (Table 13).

Testing the interaction effect of the educational program and groups, the repeated measures analysis showed astatisticallya significant effect by groups interaction for the PU knowledge test (F = 23.5*P*<0.001). This indicated that the response of experimentalgroup was different from that of the comparison group. The value of F-test (32.9) was high which indicates that there was significant effect of the educational program on the experimentalgroup (Table 13).Notonly the statistical differences were significant, but also the results showed statisticallya significant effect presented by Partial Eta Squared (ή=0.18 for education and 0.14 for education *group)(Table 13).

Table 13.Analysis for the effect of educationon nurses'knowledge towards PU prevention and treatment (N=194)

Repeated Measures			
Effect	F	p-value	Partial Eta Squared (ή)
Education	32.9	<0.001**	0.18
Education * Group	23.5	<0.001**	0.14

** Significant at the 0.01 level (one tailed)
* Interaction

Effects of the educational program on nurses'attitudes

Nurses' as a whole (experimentaland comparison group) demonstrated positive attitudestowardsPU prevention and treatment, irrespective toparticipants' characteristics of the experimental group(M=34.7, SD= 3.5, range= 26-46) and thecomparison group (M= 34.2, SD= 4.1, range=25-41) (Table 14).

The *t*-test was used to analyze if there were significant differences between the experimentaland the comparison groups before conducting the educational program. The level of significance was 0.01. There were no statisticallysignificant differences between the two groups on the attitudes pre- scores (*t*= 0.78, *P* = 0.44). These resultsmade the two groups comparable regarding theeffect of the educational program on their attitudes towards PU prevention and treatment(Table 14).

Table 14.Attitudes scores between experimental and comparison groups (N=194)

Attitudes Toward PU	Group						
	Experimental			Comparison			
	n	Mean	SD	n	Mean	SD	*P* value
Pre	102	34.2	4.28	92	34.7	2.35	0.44
Post	102	35.8	3.84	92	34.8	2.74	0.01**

** Significant at the 0.01 level (one tailed)

The post-tests were completed by the experimentalgroup (n = 102) and the comparison group (n=92). The paired *t* test was used to measure the effect of education on nurses' attitudes toward PU prevention and treatment. Results of the paired *t*-test revealed no statistical significant differences (*t*=-0.18, *P*=0.85) between the pre-test and post-test mean scores of attitudes of the comparison group. In contrast, the experimentalgroup paired *t*-test showed significant statistical differences (*t*=-2.75, *P*=0.007) between the pre-test and post-testnurses' attitudes scores towardPU prevention and treatment. Additionally, the correlation between the pre-test and post-test attitudes scores of the experimentalgroup showed positive correlation (r=0.3, *P*=0.009).

Repeated measure analysis of variance was used to examine the main effect of educational program on nurses'attitudes towards PU prevention and treatment. The results showed that there were statisticallysignificant differences in mean scores of attitudes towards PU prevention and treatment between the experimentaland comparison groups (F= 6.8, *P*= .010) (Table 15).

Testing the interaction effect of educational program and groups, the repeated measures analysis showed that there was no significant effect by group interaction for the PU attitudes scale (F = 5.2, *P*= .023). This indicated that the response of intervention group was different from that of the comparison group (Table 15).

Table 15.Analysis for the effect of an educational program on the nurses' attitudes towards PU prevention and treatment (N=194)

Variable	Pre-test		Post-test		Repeated Measures		
	M	SD	M	SD	Effect	F	p-value
Experimental	34.2	4.2	35.8	3.8	Education	6.8	0.010**
Comparison	34.7	3.4	34.8	2.7	Education * Group	5.2	0.023

** Significant at the 0.01 level (one tailed)
* Interaction

Effects of the educational program on nurses'intentions

Nursesin the experimental group(M=12.5, SD = 3.8, range = 6-21) and comparison group(M=12.6, SD=2.1, range= 7-17)demonstrated positiveintentionstowards PU prevention and treatment, irrespective toparticipants' characteristics (Table 16).

The *t*-test was used to analyze if there were significant differences between the experimental and the comparison groups before conducting the educational program. The level of significance was 0.01.There were no statistically significant differences

between the two groups on the intentions pre- scores (t = 0.14, P = 0.88). These resultsmade the two groups comparable regarding theeffect of educational program on their intentions towards PU prevention and treatment.

There were statistically significant increases in the mean intentions scores from baseline (M = 12.5, SD = 3.8) to post-intervention (M = 15.1, SD = 2.5). Paired t-test showed statistically significant differences between pre and post intentions scores of experimental group (t=-6.7, P<0.001). In comparison, Paired t-test also showed statistically significant difference between pre and post intentions scores of the comparison group (t =2.4, P=0.016). Nevertheless, the correlation revealed no statisticaland lowcorrelation between the intentionsof the comparison group pre-test and post-test scores (r=0.04, P=0.72). On the other hand, the correlation revealed statistical medium to high correlation between the intentions pre-test and post-test scores of the experimental group(r=0.55, P<0.001).

Repeated measure analysis of variance was used to examine the main effect of educational program on nurses'intentions towards PU prevention and treatment. The results showed that there were statisticallysignificant differences in mean scores of intentionstowards PU prevention and treatment between the experimentaland comparison groups (F= 41.7, P<0.001) (Table 16).

Testing for the interaction effect of the educational program and group, the repeated measures analysis showed that there was a significant effect by group interaction for the PU intentions scale (F =8.4, P= 0.004). This indicated that the response of experimentalgroup was different from that of the comparison group (Table 16).

Table 16.Analysis for the effect of education on the nurses' intentions towards PU prevention and treatment (N=194)

Variable	Pre-test		Post-test		Repeated Measures		
	M	SD	M	SD	Effect	F	*P*-value
Experimental	12.5	3.8	15.1	2.5	Education	41.7	<0.001**
Comparison	12.6	2.1	13.6	2.5	Education * Group	8.4	0.004**

** Significant at the 0.01 level (one tailed)
* Interaction

Results of Qualitative Part

The focus group.

Today, robust evidence should be drawn from a combination of quantitative and qualitative research.Each has their own strengths and limitations in a given situation (Speziale & Carpenter, 2007).Krueger and Casey (2000) pointed out that the focus group interview is intended to make a group of people with specific attributes provide qualitative data related to the research topic in a comfortable environment, under the guidance of a moderator, and through group discussions. The focus group method was selected as the most appropriate method for understanding nurses' experiences (Krueger & Casey, 2000). Focus groups are used in program evaluation when the objective is to gain a detailed understanding of participants' experiences, opinions, and thoughts. The method is advantageous because interactions between participants may produce information that would not otherwise be revealed in individual interviews and because participants' interactions and discussions contribute to data analysis (Krueger & Casey, 2000). Analysis of the session was performed according to stepsoutlined by Krueger and Casey.The tapes weretranscribed verbatim on a word-processing file, and the resultingtext was analyzed in a descriptive and interpretive manner. The transcripts and fieldnotes were read several times, and the main themes were extracted.

In this study,qualitative data from the discussionof the RN focus group was used to validate and enrich the primary quantitative results. Also, since no detailed information was available about the views and beliefs of the Jordanian nurses about the prevention and treatment of PU; an eight RN focus group discussion was chosen.Both approaches were conducted concurrently, enabling the investigator to frame the outcomes measures from two different, but complementary data sources.

All selected persons who agreed to participate signed a process consent form and gave permission for the discussion to be tape-recorded. The discussion took place in a quiet private room to give the chance for the participants to reflect on their experience. The interview lasted about ninety minutes. The discussion was conducted by researcher and assistance (comoderator). The researcher moderated the group while the comoderator wrote and took notes. The role of the moderator was to help the group explore the topics on the guide in a way that generated new insights and emphasized the participants' interests and concerns. The role of the comoderator was to meet and greet the focus group participants, to assist the moderator where necessary, and to make notes on, and do the audio recordings of the discussion.

The focus group participants' characteristics.

The participants were between 24 and 47 years of age, three men and five women. Three had work experience of about three years, three had worked for about five years and two had work experience of more than 20 years. Two of the participants worked at the female ward, three worked at intensive care units, and three worked at the male ward. Six participants had a bachelor's degree and two had a Master's degree in nursing. All participants had experience working with patients having pressure ulcer.

Findings and emerging themes.

The focus group discussion data was analyzed by the author, starting immediately after the discussion. The thematic analysis guided by Krueger (2000) has steps used in analyzing the focus group data.In order to get an overall impression, the notes were read and the whole dialogue on the tape was listened to. The notes were then read and the tape listened to several times and the content was extracted and sorted. The written documents from the assistant were analyzed. Finally, a report was

written based on the notes, the tape and written documents. It was sent to all participants in the focus group for validation of the content.

Findings from the focus group discussionrevealed the following four themes:

- Lack of accurate information about PU management among nurses.
- Positive nurses values toward PU management.
- Experiences and tradition guide nursing care.
- Barriers; short staff, lack time and equipment preventing nurses from implementing PU management.

Findings from the focus group discussion showed insufficient and inaccurate nurses' knowledge about PU management. The emerging theme from the question on issues related to PU nurses' knowledge and skills were, “Lack of accurate information about PU management among nurses.”Most of interviewed nurses did not mention pressure, friction and shear as causes of PU; they considered the immobilization as the cause of PU. Even, they could not differentiate the difference between friction and shear or between the causes and risk factors of PU.

For example, one participant said:

"The patients will develop pressure ulcer if they are immobilized, this is the cause I think…."

Another participant said:

".....the donut and other devices which used for PU management are not available in our hospital…."

He mentioned donut (a piece looks like a donut) as a useful measure for PU treatment while in fact it is a detrimental according to evidence mentioned in NPUAP guidelines (NPUAP, 2009).

Other participant said: “*….we have no time for massage the redden area……”*

The participant considered massaging the redden area as a useful measure for PU management while in fact it is a detrimental according to NPUAP guidelines (NPUAP, 2009).

Even those nurses who said that they took training on PU also lack the accurate knowledge.This could be related to that PU management information they took is not updated and based on what they taught in schools of nursing which usually is insufficient (Ayello & Meaney, 2003).

One participant said: "*Nurses do very little to ensure that they come into contact with new knowledge.*"

Nurses can benefit from attending conferences, clinical meetings and seminars specifically designed by a tissue viability nurse to enlighten them on the PU prevention and management. This can be organized on updated information and conducted by a tissue viability nurse for different level of nurses at different period to facilitate their competency in the PU prevention and management (Sinclair et al., 2004). This supports the observation of the Agency for Health Care Policy and Prevention that increasing people's awareness about PU risk assessment and prevention through a well-coordinated and structured educational program is more likely to result in benefits for patients than providing no program, as the effectiveness of educational program is currently lacking a reliable research base (AHCPR, 1992).

The discussion showed that the participant nurses were unfamiliar with the content of guidelines described in the NPUAP guidelines. This is apparently clear by responses of nurses that they have no any guidelines or institutional protocols in their units for PU prevention. In the absence of guidelines or institutional protocol, nurses are satisfied with the care as it is given to the patients; they are not restricted by the fact

that some knowledge, which forms the basis of their treatment, is outdated (Gunningberg, 2005). Also they showed a great value to their colleagues' knowledge. One participant said:

"Nurses do not suffer from outdated knowledge. I think that they have the idea that they know how to handle in a way that their care is adequate. And on the whole they are right about it, I think."

The nurses thought their knowledge was good. Most of the participants did not express any lack in their knowledge but they expressed that they thought that guidelines could be good and help the nurse to remind him- or herself on what to do. It may be they felt comfortable about their knowledge because they had education in pressure ulcer prevention which involved both theoretical and practical parts. Although one participant pointed out that it is important to keep on learning and that you will never be perfect.

The second emerging theme from the question on issues related to PU nurses' personal view and beliefswas, "positive nurses' values toward PU prevention and treatment." This is reflected by their enthusiasm, nonverbal cues and frequent questions during the discussion. But this positive value was not reflected in the clinical setting due to inaccurate knowledge and well-known barriers which raise the third theme. For example, oneparticipant said:

"*The protocol, we have no one but we do really need it***.** *We will adhere to these guidelines because I think it make task accurate and easier."*

The third emerging theme from the question on issues related to methods used to prevent and treat pressure ulcers and the arguments for choosing these methods was, " Barriers; short staff, lack time and equipment preventing nurses from implementing PU prevention."Nurses mentioned workload, short staff, lacking of time and equipment

as a factor that prevented them from coming into contact with new knowledge and implementing changes:

For example, one participant said:

"There is no time for it. You are busy all the time, and to do this in your own time ..."

Other participant said:

"…lack of availability and accessibility of the bed positioning devices in the hospital… we asked patients' family to bring overlay mattress when needed…."

Most of nurses mentioned the absence of risk assessment scale or grading system in their clinical settings.The focus group discussion revealed that participants were aware of the need for risk assessment and good clinical judgment.

It is important to note that the use of risk assessment tools must only be relied on in situations where they are available, and nurses must have been adequately trained on their proper usage (NPUAP, 2009).

For example, one participant said:

"Assessing risk through looking at patient condition….".

The fourth emerging theme from the question on issues related methods used to prevent and treat pressure ulcers and the arguments for choosing these methods was,"experiences and tradition guide nursing care".

In the absence of guidelines or institutional protocols, with regard to issues related to nursing, nurses feel free to determine how they care for their patients and which priorities are made in practice (Gunningberg, 2005). Also, in the absence of updating information and the presence of strong social pressure, nursing care is strongly based on experiences and tradition (Buss et al., 2004). Most of the interviewed nurses said that there were no protocols available in their units. In their opinion, they

are in need for these institutional protocols and expressed positive intentions toward using it in their practice.

One participant said:

"*The protocol, we have no one but we do really need it***.** *We will adhere to these guidelines because I think it make task accurate and easier"*

Summary of results

This chapter presented the quantitative and qualitative research data. The SPSS software was used to analyze the descriptive and inferential data. The statistical analyses of one-hundred and ninety fournurses participating in the study showed that there were no significant differences between the experimentaland comparison group before implementing the educational program. The repeated measures analysis of variance showed that there were significant differences in mean scores of knowledge, attitudes and intentions towards PU prevention and treatment between the experimentaland comparison groups after completing the educational program. The experimental group had significant high scores after attending the educational program compared tothe comparison group who did not receive the educational program.

The effectiveness of pressure ulcer prevention and treatment education program on nurses was evaluated based on measuring nursing knowledge. Using the Pressure Ulcer Knowledge Test, nurses' knowledge was significantly improved immediately after and 3 months after the educational program sessions. This improvement is indicative of the effectiveness of the education and suggests that ongoing nurse education for pressure ulcer prevention and treatment is both necessary and important.

The statistical analysis of the nurses' demographics revealed that there wasno significant relationship between nurses' knowledge towards PU prevention and treatmentand their age, nursing clinical experience, current higher education, and last

attendance on PU training. In contrast, gender and PU research participation variables had significant relationship withnurses' knowledge towards PU prevention and treatment.

The relationship between nurses' attitudes towardsPU prevention and treatmentand theirdemographic variables revealed that nursing clinical experience and last attendance on PU training had significant relationship withnurses' attitudes towards PU prevention and treatment. On the other hand, gender, age, current higher education, source of education on PU and PU research participation had no significant relationship withnurses' attitudes towards PU prevention and treatment.

Nurses' intentions towardsPU prevention and treatment hadsignificant relationship withnurses' gender, while other variables such as age, current higher education, source of education on PU and PU research participationhad no significant relationship withnurses' intentions towards PU prevention and treatment.

Regarding the qualitative part, the thematic analysis guided by Krueger (2000) steps was used in analyzing the focus group data.Findings from the focus group discussionrevealed the following four themes:

- Lack of accurate information about PU management among nurses.
- Positive nurses values toward PU prevention and management.
- Experiences and tradition guiding nursing care.
- Barriers; short staff, lack time and equipment preventing nurses from implementing PU prevention.

CHAPTER FIVE

Discussion

This chapter presents a discussion of the study findings that support the influence of the PU educational program on nurses' knowledge, attitudes and intentions towards PU prevention and treatment. Potential implications for nursing practice, education, andadministration,strengths and limitations of the study, recommendations for future research, and conclusions are also proposed.

Barriers to improve patients' quality of life such as situational, contextual and knowledge related are evident.Employment of knowledge may prevent PU occurrence. Educational programs provide tools to create systemic changes necessary to support nurses to improve quality of care of their patients, in terms of updates about PU prevention and treatment.

This study examined the influences of using PUeducational program onnurses' knowledge of pressure ulcer, attitudes,and intentions towards prevention and treatment.

Generally, RNs were found to have low PU Knowledge(less than 50%) and medium(31% - 60%) to high(above 60%) scores of attitudes and intentions towards PU prevention and treatment. The findings of the currentstudy demonstrate that nurses displayed positive attitudes and intentions towards PU prevention and treatment. However, inadequate knowledge and clinicalbarriers such as lack of time and staff shortagecould prevent such positive attitudesand intentionsbeing reflected into clinical practice.

Nurses' characteristics and their knowledgetowards PU

The current study showed little differences in knowledgescores in regard with nursing education, years in practice, PU training, age, or source of knowledge on PU which confirm the results ofPieper and Mott (1995) and Hulsenboom, Bours,

andHalfens (2007). Pieper and Mott (1995) evaluated the knowledge of PUprevention and stagingamong nurses. Results revealed thatnurses' knowledgehad no relations with nurses' education, age, or years of work experience.This may be limited to study sample.The sample did not include nonprofessional staff who may be less likely to attend continuing education or who may have greater problems with literacyand provide PU care in clinical practice. Hulsenboom, Bours, and Halfens (2007) found that the demographic variables including age and experience of nurses had no significant influenceon PUprevention interventions

In contrastto previous argument, the present study is inconsistent with findings of Choa, Parkb, and Chunge (2011) that analyzed nurses' characteristics in relation to PUpreventionand found that morePU prevention wasdocumented by those who were younger, less experienced, and more educated.This can be furtherexplained by the current study results of the focus group. Focus group discussion revealed that nurses are satisfied with the care as it is given to the patients; they are not restricted by the fact that some knowledge, which forms the basis of their treatment, is outdated. Also they showed a great value to their colleagues' knowledge so experiences and tradition guide nursing care.

In the current study, the non significant influence of age, previous participation in PU research and level of education could be explained by unequalrepresentation between the levels in these variables. The sample had only 23 (11.9%) having master degree compared with 167(88.1%) having bachelor degree nurses. The age of majority of nurses was between 25 and 30years. Additional impact of inadequate nurses' knowledge of PU prevention and treatment may due to these unequal proportions in these variables might have contributed to the non-significant results.

Moreover, theunavailabilityof a tissue viabilitynurse specialistsin Jordan as well as no available national PU guidelines may impact PUperevention and treatment in Jordanin terms of inadequate knowledge and updated evidence-based practice in this area of specialization.

Nurses' knowledgetowards PU prevention and treatment

Beeckman et al. (2011) declared that adequate knowledge about PU prevention and treatment is important to decide: (1) which patients should receive prevention, (2) which prevention should be applied,and (3) how prevention should be applied.

This study highlights concerns aboutJordanian nurses’ knowledge of PU prevention and treatment.The results of the currentstudy showed inadequate knowledge among Jordanian nurses about the PU prevention and treatment based onNPUAP Guidelines.Also, these findings suggest poor dissemination of PU Knowledgein Jordan which seems evident by no relationship between years of experience and PU knowledge.

A50% cut-off point (answering 13 out of 26 items of the PU knowledge test correctly) wasused to identify nurses' PUknowledge, which could be regarded low compared to similar ones' in literature (Halfens & Eggink, 1995).Although this cut-off is compromised, only few nurses passed the test. A higher cut- off point may “pose” serious decisions about nurses' PU knowledge.

Although results of the current study were similar to those of Pieper and Mott (1995),Panagiotopoulou and Kerr (2002), Abou El Enein and Zaghloul (2011), and Beeckman et al. (2011), different methods, knowledge test, and evaluation criteria were used. For examplePieper and Mott (1995) examined nurses’ knowledge of PU prevention and staging using a PU Knowledge Test and found that nurses had poor knowledge about PU prevention and staging. In more recent studies (Abou El Enein &

Zaghloul, 2011; Beeckman et al., 2011), resultsrevealed that nurses' knowledge was poor and inadequate. While Abou El Enein and Zaghloul (2011) found that nurses' knowledge on PU prevention is below the cutoff point (70%), Beckman (2011) utilized higher cutoff point and reported similar results.These studies suggestedthat nurses' knowledge about prevention of PUmust be increased andguidelines should be implemented in clinical practice. Different outcomes came fromSinclair et al. (2004) and Gunningberg (2004) who assessed nurses' knowledge on PU care and reported thatnurses' knowledge was moderate.

Findings of the current study obtained from thefocus groupascertained the deficit of PU knowledge among nurses. Results showed insufficient and inaccurate nurses' knowledge about PU prevention and treatment.Nurses were found to be unable to eitherdifferentiate the difference between friction and shear or the causes and risk factors of PU.For example, they considered using donut andmassaging of the bony prominence as usefulin PU treatmentwhile in factthese are detrimental and non-usefulmeasures according to NPUAP guidelines (NPUAP, 2009).

Apparently, the knowledge about PUprevention andtreatment are poor and not very well known among nurses. Pressure ulcer prevention and treatment rarely seem to be basedon scientific evidence, but rather on expert opinion and tradition. Moreover, the dissemination of knowledge about PU preventionand treatment among nurses is also found to be influencedby barriersrelated to the use of guidelines, lack of staff and lack of time. Similar resultswere found by Moore and Price (2004)who pointed out a gap between theoryand practice despitenurses' positive attitudes towards PU prevention due tobarriers such as lack of staff and lack oftime. Compared to Halfens and Eggink(1995), and Abou El Enein and Zaghloul(2011),the current study concludes that

despite the increased attention and new developments in the area of PUcare, knowledge about PU prevention and treatmentis stilllow and has not greatly increased.

Numerous explanations of lackof nurses' knowledge ofcurrent evidence based practicewere evident. Oneis related to educational opportunities; availability, timing, staffing, and costs. Furthermore, staff turnover has increased inthe last fiveyears(Hayajneh, AbuAlRub, Athamneh, & Almakhzoomy, 2009), making it difficult for a facility to maintain necessaryPU education program and to maintaina staff educational base related to PU up-to-date. Hayajneh et al. (2009) considered theturnover of Jordanian registered nurses in hospitals as a significant problem that requires effective strategies to deal with.

An additional aspect in PU prevention is the Risk Assessment Scale (RAS).The risk assessment toolsalong with advancedPU prevention measureswere not available in most Jordanian hospitals which werereflected in the attitudes, knowledge test,and focus group discussion.Nurses were notwell oriented withsuch advanced measures and using the PURAS which could also explain nurses' lackof knowledgeon PU prevention and treatment. This lack of knowledge canlead to less than optimal care if the nursesarestill practicing outdated methods and/orinconsistent therapies. In the qualitative part of the study few nurses mentioned the lack of knowledge as an important barrier to carrying out pressure ulcer risk assessment, documentation and PU prevention. The focus group discussion reflected that nurses thought their knowledge was goodand felt comfortable about their knowledge on PU prevention and treatment.

For example, one interviewee said:

"Nurses do not suffer from outdated knowledge. I think that they have the idea that they know how to handle in a way that their care is adequate. And on the whole they are right about it, I think."

Nurses' attitudes towards PU prevention and treatment

According to the current study, the model of Planned Behavior Theory was used to guide the interpretation of the influences of education on nurses' attitudes on skin care to preventand treatPU. The study revealed a significant correlation between knowledge gained through PU educational program and attitudes towards PU prevention and treatment. According to Petty and Cacioppo (1996), attitudes are important because they give an expectation of individuals. As stated by Ajzen and Fishbein (2005), positive attitudes towards an issue is an important influential factor that determines an individual's likelihood of carrying out a positive behavior. These findings have been supported by Champion and Leach (1989) and Hicks (1996) who showed a positive impact of attitudes on the quality of nursing practice.

In this study, the pre education attitudes of the participants were not corrected with previous formal training in PU prevention and treatment. These findings were comparable to Moore and Price (2004) who found that attitudes were not influenced by any formal training in PU prevention and treatment. The fact that PU training did not influence the attitudes of nurses requires more reflection. Most of the interventions to improve patient care are focused on in-service training using lecturing as teaching method. In the absence of tissue viability nurse specialist in Jordan , PU training usually given by uncertified nurses and might contains outdated information.Therefore, the effectiveness of such teaching may not have the required effectiveness on patients' care. Literature revealed several interventions proposed to improve attitudes and practice and indicated an interactive components and constructive feedback of participants (Pittet et al., 2000; Jenkins& Fallowfield, 2002).

From an additional view, the influence of senior nurses may be significantin relation to PU knowledge and attitudes, which address that nursing care is guided

byexperiences. This was high lightened byBuss et al. (2004) who claimed that nursing care is strongly based on experiences and traditionsin the absence of updated information and thepresence of strong social pressure.Thus, PU prevention and treatment can be improved by education and paying attention to nurses' clinical expertise.

Moreover, the attituds towards priorities in PU prevention was correlated with the nurses' knowledge, which is comparable to the findings of Bostrom and Kenneth (1992)whofound that lack of interest and low priority in PU prevention are the main barriers to effective PU care. A variety of environmental and clinical factors may impede nurses’ ability to prevent patient's skin breakdowneven when those nurses had sufficient knowledgeon risk factors of keeping the skin integrity(Bostrom & Kenneth, 1992).Additionally, evaluation of knowledge, attitudes, prevalence, and adequacy of prevention should be organized on a frequent basis. For example, Lahmann et al. (2010) participation in pressure ulcer surveys led to:

(1) lower pressure ulcer prevalence rates.

(2) increased use of all guidelines/risk assessment scales.

(3) increased use of most preventive measures and devices.

In contrast, Hulsenboom et al. (2007) found that being employed in an institution that monitors pressure PU hardly affects the knowledge level.

Interestingly, the lack of use of risk assessment scaleswas also reflected in this study. The respondentsdid not mention the use of risk assessment scales as a PU preventive measure. In addition, these findings reflected in the focus group discussion. Most of the participants said that they did not have any risk assessment tool or grading scales in their clinical practice.Most of the nurses in the focus group said that there were no protocols available in their practice, but they expressed positive attitudes and

intentions towards using these protocols or guidelines in practice. Inthe attitudespart, the participants thought thatthe use of a PU risk assessment toolswouldmake their own clinical judgement accurate and easier in relation to PU care.

In contrast with the current study,Gunningberg et al. (2001) and Moore and Price (2004) stated that majority of the nurses considerPU prevention as being of low priority in theirdaily work. Also, in a study by Buss et al. (2004), PUprevention was a great issue in daily work of nurses. If low priority is given to PU prevention, it may be unlikely toexpect to have adequate PU prevention.

In this study, lack of time and staff were commonly cited as nurses' perceived barriers towards carrying out PU prevention, whilst lack of training and education was ranked later. These findings weresupported by the result ofJordan O’Brien and Cowman (2011) who found that lacking of time and staffwere the main barriersto the completion of nursing documentation of PU care plans.Moreover, the turnover lessen the time for documenting the delivery of care (Jordan O’Brien& Cowman, 2011)

Pressure ulcer prevention and treatment is aninterdisciplinary problem. Thus, if all members of the team do not fully contribute to patient's care, the efforts of others may be fruitless. An additional problem is staff shortages, which results in the overstretching of staff atthe clinical level. Certain aspects of PU prevention, such as repositioning, are difficult to carry out unaided. If staff shortages continue, and given the pressure on staff to prioritize tasks, it will be of no surprise thatPU prevention becomes of less priority.

Nurses' intentions towards PU prevention and treatment

Intentionsare deemed important to predict behavior. According to the Theory of Planned Behavior, intentions to behave predict actual behavior in practice (Ajzen & Madden, 1986).Thus, the aim of this study was to evaluate nurses' intentions towards

PU prevention and treatment practices.Ajzen and Madden (1986) suggested that there are two independentfactors determining individual's intentions toperform a particular behavior. These factors are personal(the attitude towards the behavior) and social (the socialpressure to perform the behaviour). The latter encompasses the concept that 'important others'influence the likelihood of an action being carried out (Ajzen& Madden, 1986).

The present study founda significant relationship between gender, years of clinical experience, and source of education with nurses' intentions towards PU prevention and treatment. Other demographic variables such as age, current higher education and involvement in PU research had no similar relationship.

Nurses in this study reported positive intentions towards the implementation of PU guidelines and thought they had control over this action. Although nurses perceive themselves to have control over the implementation of PU prevention and treatment and were intending to adhere to it, their intentions may not being reflected in the clinical setting due to absence of PU guidelines in addition to the contextual barrier as lack of staff and lack of time. These barriers were appearently reflected in the attitudes. Furthermore, nurses emphasized barriers such as lack of staff, time and resources during the focus group discussion. However, based on the present study, nurses have intentions to change,and their intentions could be positively changedtowardsPU prevention and treatment. Lack of knowledge and presence of clinical barriers may influence nurses' intentions to have better clinicaldecisions. Lamond and Farnell (1998) identified thatnurses with sounder knowledge made better clinicaldecisions compared to those with a poorer knowledge, thusreiterating the importance of education.

These resultswere contradictory to Ke, Chiu, Hu, and Lo (2008) who evaluated the nurses' knowledge, attitudes, and behavioral intentions regarding supplying

artificial nutrition and hydration to terminal cancer patients and found thatnurses' intentions are trended towards the negative behavioral intentions.

The significant correlation between subjective norm and intentionsdiffered from previous studies (Watson & Myers, 2001). In general, previous studies found that social influence on intentions has been less important than attitudes or perceived behavioral control (Godin & Kok, 1996). While,thecurrent study addresses that social norms had the strongest effect on nurses' intentions towards implementing the NPUAP guidelines; Buss et al.(2004)found nurses do not seem to have the intentions to change their preventive actions. However, further research to study those approaches would helto change nurses' knowledge, beliefs, and performance regarding PU preventionand is recommended. Potentially useful interventions in this respect include education and updated courses in the context of a comprehensive approach that include multimethod teaching strategies and updated information about PU prevention to be conducted by a tissue viability especialist.

Influence of education on nurses' knowledgetowards PU prevention and treatment

Education is necessary to improve knowledge. McCluskey and Lovarini (2005) found that continuing professional education can improve knowledge, but also found that the subsequent impact on behaviors was limited. In another study, Caliri et al. (2003) found that nursing students' knowledge about PU were higher if they participated in practical training about PU or used a Web site about PU.

In the current study, nurses' knowledge on PU was heightened following conduction of a PU educational program. The results showed thata PU education program produced positive outcomes at global rates on PU knowledge regarding different aspects of PU preventive measures such as causes, nutrition, and risk assessment.

The results of the currentstudy supported the work of Pieper and Mott (1995) who found that nurses' knowledge was significantly higher when nurses recently had a lecture or read an article on PU. Paquayet al. (2010) also found that adherence to PU guidelines changed significantly after implementation of an educational program. In contrast, the results of Pieper and Mattern (1997) was inconsistent with previously work. Pieper and Mattern (1997) found that knowledge was not significantly changed when nurseswere exposed to updates.

The importance of knowledge retention beyond the immediate program application cannot be over-emphasized. Although there was a significant decrease in PU knowledge, overallPU education was effective in increasing nurses' knowledge for a longer time. The short-term decrease in scores may have been affected by factors suggested by Maylor and Torrence (1999) such as staff shortages, nurses' employment mobility, new workplace priorities, or a lack of equipment for the new protocols.

Influence of Educationon nurses' attitudes and intentions towards PU prevention and treatment

The TPB was selected as a theoretical framework for the study because it has been used successfully to understand other professional behaviors. As hypothesized, the present study supported that the key constructs of Ajzen's TPB contribute to illuminating nurses' intentionstowards PU prevention and treatment.The theory of Planned Behavior can be applied to explain nurses' intentionstowards PU prevention and treatment.

Nurses demonstrated a positive intentionstowards PU prevention and treatment; irrespective to their characteristics such aslevel of education, years of experience, PU training, age,and/or source of education on PU. The current study found that PU education based on the Theory of Planned Behavior resulted in stronger intentions by

the participants towards implementing PU prevention and treatment. Also, there was a significant effect of PU education on nurses' intentions towards PU prevention and treatment. Compared to Ke, Chiu, Hu, and Lo (2008) who studiednurses' knowledge and attitudes among cancer patients, although nurses' knowledge improvedafter implementing an educational intervention, their intentions did not differ. These authors admitted the need for long-term moral, ethical and communicationtraining because the behavioral intentions of nurses were affected by other variables.

Nurses showed positive intentionscompared to those at the baseline. Changes in attitudes, norms, and perceived control accounted for the intentions. The Theory of Planned Behavior has application in educational settings as a method of modifying practice among health practitioners, provides a theoretical framework and the practical means of going beyond information dissemination that is required to translate new discoveries into improved practice(Ajzen & Fishbein, 2005).

McCluskey and Lovarini (2005) asserted that continuing professional education can improve knowledge, but the subsequent impact on behaviors was limited.The "knowledge gap" among the participants as described by Sinclair et al. (2004) and Gunningberg (2004) can be ameliorated in part by educational training program that are guided by the theory. This possibility rests on the theory's postulated relationship between intentions and behaviors. An intervention that applies the Theory of Planned Behavior consistently enhanced the intention- and-behavioral relationship. Continuing education that is structured with a Theory of Planned Behavior may be particularly well positioned to capitalize on the intention-and-behavioral relationship.The effectiveness of this study was intensified by the participants' positive intentions, whilst barriers such as lack of time, staff, equipments and training could be the reasons preventingnurses to exercise their intentions.

The study findings supported the TPBthat nurses' positive attitudes and perceived behavioral control increased their positive intentions towards PU prevention and treatment.Although, subjective norm was the most significant determinants of nurses' intentions towards PU prevention and treatment; Puffer and Rashidian (2004) admitted that subjective norm was not related tonurses'intentions to use clinical guidelines.These findings showed that nurses who reported a positive attitude and attended PU educational program developed stronger intentions towards PU prevention and treatment.

Conclusion

Pressure ulcer causes substantial harm to patients, limits their performance status, is painful and may lead to severe infections. Globally, maintaining skin integrity and preventing PU have traditionally been the responsibility of nurses. Pressure ulcer prevention and treatmentbased on knowledge of risk factors, prevention, and early intervention is crucial to decreasing PU incidence. Research-based nursing practice is frequently stressed in educational endeavors.

In the current study, the majority of the nurses did not have sufficient knowledge to demonstrate competency of PUprevention and treatment at the pre test phase. In fact, few nurses achieved the minimum scores(50%; 13 out of 26 correct scores) to pass during the pretest. The findings of the PU educational program coincided and supported what was already known in the literature: that is,nurses are not equipped with enough education to appropriately prevent and treatPU. On the other hand, having additional training, nurses improve their understanding of PU and this positively affects their attitudes and intentions towards PU prevention and treatment. Data revealed that upon post implementation of the PU educational program,nurses' knowledge and awareness regarding PU was increased. This supports the need to

implement a PU educational program in Jordanian health care settings to improve patients' outcomes.

In conclusion, Jordanian nurses' knowledge onPU prevention and treatment was inadequate. Further, adequate dissemination of PU prevention and treatment guidelines seems to be a prerequisite to improvethe quality of PU prevention and treatment. Improving practice requires a multi-faceted approach to assure adequate support to make changes reflected on patients' outcomes.

Implications and Recommendations

The quality of care related to PUis in need of improvement. A pressure ulcer has the propensity to affect an individual'soverall health.Hence, efforts must be made to decrease PU prevalence. Having the adequate knowledge onPUprevention and treatment is crucial in preventing PU development among hospitalized patients. It was apparent that nurses arein need to attend more training and education programs in order to properly assess, prevent and care for patients with PU. Additionally, training allows the nurses to gain experience and confidence to use updates in their practice. The results of this study have the potential to significantly impact future studies related to PU. Moreover, the results of this study can be considered as baseline to establishing national guidelines for PU prevention and treatment.Also, findings can be platform for nurse educators, administrators, and researchers in regard to PU prevention and treatment.

Nursing Practice.

The result of this study can be applied to nurses caring for patients who are at risk of PU development and/ or having PU. Study results assert the need of Jordanian nurses to attend such educational program to increase their knowledge and to enhance their intentions towards PU prevention and treatment.Results of the current study also

indicate the need to establish a national guidelines conducted by tissue viability specialists. This will standardizedPU care at the clinical settings and provide nurses with sufficient knowledge that improve the quality of nursing care in this area of practice. Sufficient knowledgeenhances and increases the nurse's sensitivity to earlier preventive measures that decreases incidence and prevalence of PU.Employing certified tissue viability nurses in hospital settings may highten quality of care provided to patients at risk of PU or having a PU and can be effective tool in PU prevention and treatment. Results of the current study also indicate the need to provide the clinical settings adequate resources in term of equipment, training, and staffing.

Nursing Administration.

The need to establish Jordanian national guidelines related to PU management and employing a tissue viability nurse in our hospitals is strongly recommended by the current study. Development of national mandates can overcome barriers, including development of clinical guidelines and quality improvement initiatives. PU guidelines help nurse managers todevelop policies and PU procedures and protocols of caretoenhance the translation of findings into practice. PU guidelines may enhance nurses' attitudes and intentions towards PU care, alongside in planning standardized educational programs for nurses. The educational program addresses aspects such as skin assessment, PU risk assessment, appropriate use of PU prevention equipments and basic skin care (Bales & Padwojski, 2009).Internalizing these guidelines throughout the health care systems can lead to PUreduction and this will lead to a decrease not only of patient and family suffering but also health care burdens, thus decreasing length of stay and the cost of PU care.Hospitals are in need to develop continuing education programs on PU prevention and treatment. Making PU education an element of continuing

education, nurses and clinical ancillary staff will remain informed regarding the latest developments in wound care.

Nursing Education.

The current study identified certain knowledge deficiencies. Theresults of this study can guide the nurse educator to different aspects, reasons, and barriers to nurses' knowledge on PU care. Nursing faculties can give more attention to PU care and integrate related topics into nursing curricula and allocate adequate clinical hours for nurses who are dealing with patients having or prone to having a PU.It assists educators to modify educational material to alter the orientation and the competency evaluation process.The use of standardized PU educational program based on national guidelines will ensure that all students and nurses have similar knowledge required for providing optimal quality of care. The results of this study also suggest that continuing education programs may be as important for experienced nurses as well asnovice nurses. Acquiring basic knowledge regarding PU prevention and treatment and remaining up-to-date with recent developments in PU care present challenges to nurses who provide direct patient care and caring patients having PU.

Nursing Research.

The current study revealed a benchmark of Jordanian nurses' knowledge, attitudes, and intentions towards PU prevention and treatment. The relationship between demographic data and PU knowledge, attitudes, and intentions still needs more exploration by future studies. Future work should include direct observation to evaluate the influence of PU educational program on PU care thus testing the actual behaviors of nurses and their intentions. Results also raise the need to evaluate whether there is a significant difference between the effects of PU education program conducted by a certified tissue viability nurse and non certified nurse or not.

Strength and Limitation

First,the current study used self-report questionnaires for data collection in the quantitative part. Testsabout PU knowledge were at baseline, with the second and third sessions were completed under direct observation since the non-observed tests often results in missing data and poorresponse rates, making interpretation of resultschallenging.In addition, using focus group discussion yielded anin-depth data about nurses' knowledge, attitudes and intentionstowards PU prevention and treatment.Second, this study was conducted onnurses working in hospitals in Amman,Jordan. However, these nursesaresimilar to those of other Jordanian nursesas there are no great regional differences in the education that nurses receive. Researcher believes that these results can be applied to all nurses working in Jordan. Third, contamination between nurses in the experimental and the comparison groups who are working at the same hospital may hasoccurred. Fourth,this study evaluated nurses'knowledge, attitudes and intentions. Measuring educational outcomes (knowledge, attitudes and intentions) was not sufficient to appraise the influence and success of the educational program. The measurement of clinical outcomes such as prevalence and incidence can be essential to ascertain an accurate influence of implementingan educational program. Fifth, the participants were selected randomly so they could be less motivated to perform the test and givenegative results. Sixth, the socially desirable answers especially during the attitudes assessment could lead to positive attitudes results, despite the anonymous characteristics of the instrument.

Finally, this study is one of the first studies conducted in Jordan on nurses' knowledge, attitudes, and intentions towardsPU prevention and treatment. Itis also one of the first studiesthatevaluate nurses' intentions towards PU guided by the Theory of

Planned Behavior.Findings, implications, and recommendation of this study canhelp researchers in future work on PUprevention and treatment.

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Appendix 1

Participant demographics

Gender
Female
Male

Age
20–24
25–29
30–34
35–39
> 40

Basic education
Bachelor’s degree
Master’s degree

Number of years of work experience
<2 years
2–5 years
5–10 years
10–15 years
15–20 years
>20 years

Units
Intensive care unit
Medical ward

Specific education on pressure ulcers
No
Yes

Source of education on pressure ulcers
University degree studies
Vocational nursing studies
In-service courses
Conference attendance
Degree plus in-service courses
Other

Involvement in pressure ulcer research
Yes
No

Appendix 2

Nurses PU knowledge Test

Theme 1: Aetiology and development

1- Which statement is correct?
   a) Malnutrition causes pressure ulcers.
   b) A lack of oxygen causes pressure ulcers.
   c) Moisture causes pressureulcers.
   d) I do not know.

2- Extremely thin patients are more at risk of developing a pressure ulcer than obese patients.
   a) Correct. The contact area involved small and thus the amount of pressure is higher.
   b) Incorrect. The pressure is less extensive because the body weight of those patients is lower than the body weight of obese patients.
   c) Incorrect. The risk of developing a vascular is higher for obese patients. This increases the risk of developing a pressure ulcer.
   d) I do not know.

3- What happens when a patient, sitting in bed in a semi- upright position (60°), slides down?
   a) Pressure increases when the skin sticks to the surface.
   b) Friction increases when the skin sticks to the surface.
   c) Shearing increases when the skin sticks to the surface.
   d) I do not know.

4- Which statement is correct?
   a) Soap can dehydrate skin and thus the risk of pressure ulcers is increased.
   b) Moisture from urine, faeces, or wound drainage causes pressure ulcers.
   c) Shear is the force which occurs when the body slides and the skin sticks to the surface.
   d) I do not know.

5- Which statement is correct?
   a) Recent weight loss which has brought a patient below his or her ideal weight, increases the risk of pressure ulcers.
   b) Very obese patients using medication that decreases the peripheral blood circulation are not at risk of developing pressure ulcers.
   c) Poor nutrition and age have no impact on tissue tolerance when the patient has a normal weight.
   d) I do not know.

6- There is NO relationship between pressure ulcer risk and:
   a) Age.
   b) Dehydration.
   c) Hypertension.

d) I do not know.

Theme 2: Classification and observation

1- Which statement is correct?
   a) A pressure ulcer extending down to the fascia is a grade 3 pressure ulcer.
   b) A pressure ulcer extending through the underlying fascia is a grade 3 pressure ulcer.
   c) A grade 3 pressure ulcer is always preceded by a grade 2 pressure ulcer.
   d) I do not know.
2- Which statement is correct?
   a) A blister on a patient's heel is always a pressure ulcer of grade 2.
   b) All grades (1, 2, 3, and 4) of pressure ulcers involve loss of skin layers.
   c) When necrosis occurs, it is a grade 4 pressure ulcer.

3- Which statement is correct?
   a) Friction or shear may occur when moving a patient in bed.
   b) A superficial lesion, preceded by non-blanchable erythema is probably a friction lesion.
   c) A kissing ulcer (copy lesion) is caused by pressure and shear.
   d) I do not know.
4- In a sitting position, pressure ulcers are most likely to develop on:
   a) Pelvic area, elbow and heel.
   b) Knee, ankle and hip.
   c) Hip, shoulder and heel.
   d) I do not know.
5- Which statement is correct?
   a) All patients at risk of pressure ulcers should have a systematic skin inspection once a week.
   b) The skin of patients seated in a chair, who cannot move themselves, should be inspected every two to three hours.
   c) The heels of patients who lie on a pressure redistributing surface should be observed minimum a day.
   d) I do not know.

Theme 3: Risk assessment

1- Which statement is correct?
   a) Risk assessment tools identify all high risk patients in need of prevention.
   b) The use of risk assessment scale reduces the cost of prevention.
   c) A risk assessment scale may not accurately predict the risk of developing a pressure ulcer and should be combined with clinical judgement.
   d) I do not know.
2- Which statement is correct?
   a) The risk of pressure ulcer development should be assessed daily in all nursing home patients.

b) Absorbing pads should be placed under the patient to minimize the risk of pressure ulcer development.
c) A patient with a history of pressure ulcers runs a higher risk of developing new pressure ulcers.
d) I do not know.

Theme 4: Nutrition

1- Which statement is correct?
   a) Malnutrition causes pressure ulcers
   b) The use of nutritional supplements can replace expensive preventive measures.
   c) Optimizing nutrition can improve the patient's general physical condition which may contribute to a reduction of the risk of pressure ulcers.
   d) I do not know.

Theme 5: Preventive measures to reduce the amount of pressure shear

1- The sitting position with the lowest contact between the body and the seat is:
   a) An upright sitting position, with both feet resting on a footrest.
   b) An upright sitting position, with both feet resting on the floor.
   c) A backwards sitting position, with both legs resting on a footrest.
   d) I do not know.
2- Which repositioning scheme reduces pressure ulcer risk the most?
   a) Supine position- side 90° lateral position- supine position - side 90° lateral position- supine position-…
   b) Supine position- side 30° lateral position- side 30° lateral position- supine position-…
   c) Supine position- side 30° lateral position- setting position- 30° lateral position- supine position-…
   d) I do not know.

3- Which statement is correct?
   a) Patients who are able to change position while sitting should be taught to shift their weight minimum every 60 minutes while sitting in chair.
   b) In a side lying position, the patient should be at a 90 degree angle with the bed.
   c) Shearing forces affect a patient's sacrum maximally when the head of the bed is positioned at 30°.
   d) I do not know.
4- If a patient is sliding down in a chair, the magnitude of pressure at the seat can be reduced the most by:
   a) A thick air cushion.
   b) A donut shaped foam cushion.
   c) A gel cushion.
   d) I do not know.
5- For a patient at risk of developing a pressure ulcer, a visco- eslastic foam mattress…

a) Reduces the pressure sufficiently and does not need to be combined with repositioning.
b) Has to be combined with repositioning every 2 hours.
c) Has to be combined with repositioning every 4 hours.
d) I do not know.

6- A disadvantage of a water mattress is:
a) Shear at the buttocks increases.
b) Pressure at the heels increases.
c) Spontaneous small body movements are reduced.
d) I do not know.

7- When a patient is lying on a pressure reducing foam mattress…
a) Elevation of the heels is not necessary.
b) Elevation of the heels is important.
c) He or she should be checked for" bottoming out" at least twice a day.
d) I do not know.

Theme 6: Preventive measures to reduce the duration of pressure/shear

1- Repositioning is an accurate preventive method because…
a) The magnitude of pressure and shear will be reduced.
b) The amount and the duration of pressure and shear will be reduced.
c) The duration of pressure and shear will be reduced.
d) I do not know.

2- Fewer patients will develop a pressure ulcer if…
a) Food supplements are provided.
b) The area at risk is massaged.
c) Patients are mobilized.
d) I do not know.

3- Which statement is correct?
a) Patients at risk lying on a non pressure reducing foam mattress should be repositioned every two hours.
b) Patients at risk lying on an alternating air mattress should be repositioned every 4 hours.
c) Patients at risk lying on a visco- elastic foam mattress should be repositioned every 2 hours.
d) I do not know.

4- When a patient is lying on an alternating pressure air mattress, the prevention of heel pressure ulcers includes:
a) No specific preventive measures.
b) A pressure reducing cushion under the heels.
c) A cushion under the lower legs elevating the heels.
d) I do not know.

5- If a bedridden patient cannot be repositioned, the most appropriate pressure ulcer prevention is:
a) A pressure redistributing foam mattress.
b) An alternating pressure air mattress.
c) Local treatment of the risk areas with zinc oxide paste.
d) I do not know.

Appendix3

PRESSURE SORE SURVEY

Please tick the box that most closely reflects your answers to the following questions. If you accidentally tick the incorrect box, please put an 'X' through the box and then tick the correct box:

Section 1: Pressure Sore Prevention

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
(1) All inpatients are at potential risk of developing pressure sores	5	4	3	2	1
(2) Pressure sore prevention is time consuming for me to carry out	5	4	3	2	1
(3) In my opinion, patients tend not to get as many pressure sores nowadays	1	2	3	4	5
(4) I do not need to concern myself with pressure sore prevention in my practice	1	2	3	4	5
(5) Pressure sore treatment is a greater priority than pressure sore prevention	1	2	3	4	5
(6) Continuous nursing assessment of patients will give an accurate picture of their pressure sore risk	5	4	3	2	1
(7) Most pressure sores can be avoided	1	2	3	4	5
(8) I am less interested in pressure sore prevention than other aspects of nursing care	1	2	3	4	5
(9) My clinical judgment is better than any pressure sore risk assessment tool available to me	1	2	3	4	5
(10) In comparison to other areas of nursing care, pressure sore prevention is a low priority for me	1	2	3	4	5
(11) Pressure sore risk assessment should be regularly carried out on all patients during their stay in hospital	1	2	3	4	5

Section 2: Barriers Towards Pressure Sore Prevention

(20) Please **rank in order of importance**, in your own words, 3 barriers that would prevent you from **carrying out pressure sore risk assessment:** **1.** ____________ **2.** ____________ **3.** ____________
(21) Please **rank in order of importance**, in your own words, 3 barriers that would prevent you from **documenting pressure sore prevention care planning:** **1.** ____________ **2.** ____________ **3.** ____________
(22) Please **rank in order of importance**, in your own words, 3 barriers that would prevent you from **carrying out pressure sore prevention:** **1.** ____________ **2.** ____________ **3.** ____________

Appendix 4

INTENTIONSSCALE

SD: Strongly disagree
MD: Moderately disagree
D: Disagree
N: Neither agree nor disagree
SA: Strongly agree
MA: Moderately agree
A: Agree

NPUAP: **N**ational **P**ressure **U**lcer **A**dvisory **P**anel
Scoring: Calculate the mean of the three intention scores.

Intentions	SD	MD	D	N	A	MA	SA
I expect to carry out NPUAP guidelines to my patients							
I want to carry out NPUAP guidelines to my patients							
I intend to carry out NPUAP guidelines to my patients							
PCB	SD	MD	D	N	A	MA	SA
I am confident that I could implement NPUAP guidelines to my patients							
negative endpoint	Easy :1	2	3	4	5	6	Difficult:7
For me to implement NPUAP guidelines to my patients is:							
	SD	MD	D	N	A	MA	SA
The decision to implement NPUAP guidelines to my patients is beyond my control							
Whether I implement NPUAP guidelines to my patients or not is entirely up to me.							
subjective norm							
It is expected of me that I implement NPUAP guidelines to my patients							
People who are important to me want me to implement NPUAP guidelines to my patients							

I feel under social pressure to implement NPUAP guidelines to my patients							

How much do you ***agree*** or ***disagree*** with each of the following statements about?
Check (✓) one space for each question.

Thank you for taking the time to complete this questionnaire. Your contribution is greatly appreciated. Please put the questionnaire in the envelope provided and place it in the collection box located at the nurses' station.

Appendix 5

إقرار الموافقة للمشاركة فى الدراسة

عزيزي الممرض/ الممرضة،،،

انا جمال قدومي طالب دكتوراة تمريض/ الجامعة الأردنية اقوم بعمل دراسة حول فعالية البرنامج التعليمي عن التقرحات على مستوى المعلومات والاتجاهات لدى الممرضين اتجاة هذة التقرحات وذلك من أجل تحسين نوعية العناية التمريضية المقدمة للمريض ومن أجل الحد من هذه التقرحات ومضاعفاتها السلبية0

نرجو من حضرتك التعاون في تعبئة الاستمارة المرفقة، علماً بأن جميع المعلومات التي ستذكر سوف تعامل بسرية تامة ولأغراض البحث العملي فقط.

ولكم جزيل الشكر

الإقـــرار

أنا الموقع أدناه أوافق على المشاركة في هذه الدراسة بعد أن تم شرح هدف وتعليمات الدراسة اللازمة لتعبئة الاستمارة

الاسم (اختياري) : ....

التوقيـع : ....

التاريـخ : ....

الرقم (وذلك للمقارنة بين نتيجة الفحص القبلي والبعدي): ....

شاكرين لكم حسن تعاونكم

Appendix 6

RE:

Monday, September 27, 2010 8:00 AM

From:

"Zena Moore" <zmoore@rcsi.ie>

Add sender to Contacts

To:

"'jamal qaddomi'" <jamal9877@yahoo.com>

Message contains attachments

1 File (64KB)

- Questionnaire.doc

Dear Jamal,
I enclose the questionnaire and wish you every success with your studies, I have written the scoring on each question, the higher the overall score, the more positive the attitudes,

Best wishes,

Zena

Dr. Zena Moore, PhD, MSc, FFNMRCSI, PG Dip, Dip Management, RGN
Lecturer in Wound Healing & Tissue Repair and Research Methodology,
Faculty of Nursing & Midwifery,
RCSI,
123 St Stephen's Green,
Dublin 2,
Ireland.

Tel: 00 353 1 4022414
Email: zmoore@rcsi.ie
www.rcsi.ie/zenamoore

Appendix 7

RE:

Wednesday, June 30, 2010 3:46 AM

From:

"Dimitri Beeckman" <Dimitri.Beeckman@UGent.be>
View contact details

To:

"'jamal qaddomi'" <jamal9877@yahoo.com>

Message contains attachments

1 File (1799KB)

- Author Copy.pdf

```
Dear Jamal

Please find enclosed the article.
The time to complete is approx. 30 minutes. Instructions
on scoring can be
found in the article.

Kind regards,
Dimitri Beeckman

-----Oorspronkelijk bericht-----
Van: jamal qaddomi [mailto:jamal9877@yahoo.com]
Verzonden: woensdag 30 juni 2010 12:36
Aan: Dimitri Beeckman
Onderwerp: RE:
```

Appendix 8

Educational Program

Pressure ulcersManagement
Handout

INTRODUCTION

Pressure ulcers are considered significant health problem, not only because financial costs but also in terms of human suffering, pain, disfigurement, loss of productive time and changes in body image.

Pressure ulcers management is a fascinating, rewarding and challenging area of practice is no longer a matter of simply changing a dressing; it is a specialty that is truly multidisciplinary involving doctors, nurses, dietician, and physiotherapist.

Much progress has been made in the last few years and there still more to discover in this field of specialization, Pressure ulcers care can seem correspondingly complex to the vast changes and developments made upon modern dressings, cleansing methods of the pressure ulcers, and wound care techniques, instead of wide range of choices available for pressure ulcers management which can cause considerable confusion for many nurses.

The purpose of this course is to clarify and introduce nurses to consistent pressure ulcers management guideline essential to care patients with pressure ulcers in their clinical settings.

REVIEW OF ANATOMY AND PHYSIOLOGY of THE SKIN

The skin completely covers the body and are continuos with the membranes lining the body orifices

STRUCTURE OF THE SKIN:

1. **EPIDERMIS**
2. **SUBCUTANEOUS FATTY LAYER**
3. **DERMIS**

EPIDERMIS:

- Composed of stratified keratinised squamous epithelium
- Complete replacement of the epidermis takes about 40 days.

- The maintenance of healthy epidermis depends upon three processes being synchronized:

1. Desquamation of the keratinised cells from the surface
2. Effective keratinisation of the cells approaching the surface.
3. Continual cell division in the deeper layers with newly formed cells being pushed to the surface.

- The color of the skin affected by three main factors:

  Melanin, a dark pigment derived from the amino acid (tyrosine) and secreted by (melanocytes) in the deep germinative layer
    1. The level of oxygenation of hemoglobin and the amount of blood circulating in the dermis, give the skin its pink color.
    2. Bile pigment in the blood and carotenes in the subcutaneous fat give the skin a yellowish color.

DERMIS:

Is a tough, elastic, formed of connective tissue layer, and its matrix contains collagen fibers interlaced with elastic fibers, fibroblasts, macrophages, and mast cells are main cells found in dermis

- The structure of the dermis:

1. Blood vessels.
2. Lymph vessels
3. Sensory (somatic) nerve endings.
4. Sweat glands and their ducts.
5. Hair, erector pili muscle and sebaceous glands.

FUNCTIONS OF THE SKIN

1. PROTECTION:

- Forms a waterproof layer that protects the deeper and more delicate structure, it acts as a
  Barrier from:
    1. Invasion of microbes
    2. Chemicals
    3. Physical agents. E.g. mild truama, ultraviolet light
    4. Dehydration
- Contains langerhans cells, to phagocyte intruding antigens and travel to lymphatic system
- Reacts by reflex action to unpleasant or painful stimuli, protecting from further injury.

2. **REGULATION OF BODY TEMPRATURE**:

- The body temp.remains about 36.6C. (98.4 F.)
- To ensure this constant temp. A balance is maintained between heat produced in the body and heat lost to the environment.
- Heat produced by: muscular contraction, chemically active liver and digestive organs.

- Heat lost by: evaporation, radiation, conduction, and convection.
- Control of body temperature by: nervous control (temp. regulating center in the hypothalamus), activity of sweat glands, effects of vasodilatation,

3. FORMATION OF VITAMIN D

7-dehydrocholeterol is a lipid –based substance in the skin, and ultraviolet light from the
Sun converts it into vitamin D, with calcium and phosphate.

4. SENSATION:

Sensory reaction to touch, pressure, temperature or pain.

5. ABSORPTION:

- Some drugs, in transdermal patches, e.g.hormones, nicotine
- Some toxic chemicals e.g. mercury.

6. EXCRETION:

- Sodium chloride in sweat.
- Urea, especially when kidney function is impaired.
- Aromatic substances

WHAT IS THE WOUND?

Any damage leading to break in the continuity of the skin.

CAUSES:

1. TRAUMA-mechanical, chemical, physical
2. SURGERY
3. ISCHEMIA- arterial leg ulcer
4. PRESSURE – pressure sores

WOUND CLASSIFICATION:

1. Partial or full thickness
2. Primary or secondary intention
3. Open or closed

WOUND HEALING PROCESS
STAGES OF NORMAL WOUND HEALING PROCESS

- A series of highly complex, interdependent, and overlapping stages.

1. **INFLAMMATION**
2. **RECONSTRUCTION (GRANULATION)**
3. **EPITHELIALISATION**
4. **MATURATION.**

1. **INFLAMMATION**:

- Is a non-specific local reaction to tissue damage and /or bacterial invasion
- The signs and symptoms: redness, heat, pain, and swelling
- Tissue damage triggers complement and kinin systems, complement system consists of plasma proteins which are inactive precursores, when activated leads to release of histamine from the mast cells and results in vasodilatation and increased capillary permeability----this effect enhanced by the kinin system which have several effects: to attract neutrophils to the wound, and enhance phagocytosis, and cause pain.
- As the capillary dilate fluid flows into the injured tissues (inflammatory exudates), contains: antibodies, red and white blood cells and platelets
- Platelets release growth factors and fibronectin; their role is to promote cell migration and growth at the wound site.
- Fibronectin attracts neutrophils (phagocytosis effect)
- Growth factor attracts monocytes (macrophages)-able to phagocytose larger particles
- Inflammation lasts about 4 – 5 days.

2. **RECONSTRUCTION:**

- Macrophages produce growth factors which attract fibroblasts, divided then produce

Collagen fibers (2nd.day).

- The activity of the fibroblasts depends on the local oxygen supply.
- Little seen of this stage of healing by primary intention, but, could be seen as to be filled of granulated tissues.
- Fibroblasts may play a further role which is a contractile effect stars around 6^{th}.day which reduces the surface area of open wounds, this contraction responsible for 40-80% of open wounds closure
- The length of time needed for reconstruction depends on the type and size of the wound, but may be about 24 days for wound healing by primary intention.

3. **EPITHELIALIZATION:**

- *The phase where the wound is covered with epithelial cells.
- Represents proliferation of squamous cells at the wound margins and migrate over the viable tissue of the wound surface

- Requires moist environment (winter1962)
- Commences as early as the second day in closed wounds, but the time span is unknown regarding open wounds because it is necessary for the wound cavity to be filled with granulation tissue before epithelialization can commence.

4. <u>MATURATION:</u>

- The wound becomes less vascularized
- The scar tissue present gradually remolded and becomes comparable to normal tissue after long period of time; the scar gradually flattens to a thin white line.
- This takes up to a year in closed wounds and very much longer in open wounds.
- The tensile strength will be restored gradually, during maturation it increases so that by three months the tensile strength is 50% that of normal tissue

FACTORS AFFECTING NORMAL HEALING PROCESS

1. INFECTION:

- ♦ Systemic infection affects healing process, as the wound has to compete with any infection for white cells and nutrients.
- ♦ Healing may not take place until after the body has dealt with the infection.
- ♦ Systemic infection is frequently associated with pyrexia, which causes increase in metabolic rates.
- ♦ All wound are contaminated with bacteria, especially open wounds, this doesn't affect healing. But clinical infection do so
- ♦ Infection prolongs the inflammatory stage of healing, and inhibit the ability of fibroblasts to produce collagen
- ♦ It has shown that there may be a loss of 20 – 30 % of the initial body weight in the presence of major sepsis
- ♦ Infection also causes pain that raises the metabolic rate.

2. AGE:

- ♦ Patients over 65 years old are six times more likely to develop infection in a clean surgical wound than a child under 14 years old.
- ♦ Epidermal regeneration takes longer
- ♦ The inflammatory response is weakened
- ♦ Reduced barrier function of the skin
- ♦ Vascularity, elasticity and tensile strength is reduced
- ♦ Sensory perception is reduced.

3. OBESITY:

4. NUTRITIONAL STATUS

5. **IMMUNOSUPPRESSED PATIENTS (ONCOLOGY CASES**)

patients receiving radiation therapy, steroids therapy, or antibiotics

6. LENGTH OF STAY

7. **BED OCCUPANCY**:

More than 25 beds in open wards increases the risk to have wound infection

8. **LOCAL FACTORS**:

Oedema, ischaemia, skin lesions, foreign bodies

9. LOCATION.

10. GENERAL HYGIENE

11. INCONTINENCE

12. IMMOBILITY

13. **MENTAL STATUS&PSYCHOLOGICAL ASPECT**

- Have a negative effect on the health of
- Psychological problems are known to individuals.
- Stress leads to lack of sleep and sleep isimportant for tissue repair.

14. **MULTISYSTEM DISEASES**:

- cardiac, renal, hepato, CNS…etc.
- DM
- Anaemia
- Cancer
- Arteriosclerosis
- Immune Disorders
- Inflammatory diseases
- Rheumatoid Arthritis(connective tissue disease)

15. SOCIO ECONOMIC STATUS

16. STRESS AND ANXIETY

17. PAIN
19. DRUG THERAPY

- Cytotoxic drugs can induce neutropenia, loss of appetite and vomiting
- Anticoagulants stops the blood clotting process
- Corticosteroids and anti-inflammatory drugs interrupt cellular division and reduce the inflammatory response.

WOUND ASSESSMENT

Why to assess a wound ?

1. Provides baseline information, so progress can be monitored

2. Aids transfer of information

3. Aids appropriate selection of wound management dressing.

Wound assessment should include

- Classification
- Location
- Aetiology
- Duration
- Dimensions……
- Amount of exudates
- Wound bed appearance
- Condition of surrounding skin
- Odour
- Pain.

Wound classification

Chronic - of long duration more than 6 weeks e.g. Leg Ulcer ,Pressure Sore
Acute- traumatic wound e.g. cut, laceration
Post-op - intentional, heals by primary intention ,clips or sutures

Description of wounds according to depth

Erosion : Loss of one or two layers of epithelial cells
Superficial Epidermis has been damaged
Partial thickness: Epithelium & part of the dermis is destroyed
Full thickness All of the epidermis & dermis is destroyed. Muscle & bone may be involved.

Location

- wounds close to joints are slower to heal, due to less vascularity. Location may also indicate:
- potential problem for infection i.e. sacral wound and
- patients potential mobility.

Aetiology

- It is important to know the cause of the
wound e.g. pressure sore, burn, malignant, leg ulcer, surgical wound.

Duration

- Wounds of long duration such as pressure sores and leg ulcers take longer to heal.

Dimensions.

- There are numerous ways of measuring a wound
  -Tape measure and cotton bud
  -Acetate tracing
  -Photography
  -Wound moulding
  -Structured light
- The most practical method for nurses is to use the method which is user friendly and available in your area.

Exudates.

- Is the fluid which seeps from the wound surface.
- It can be clear in colour or can become opaque as it contains leucocytes, albumin, macrophages and cellular debris
- Assessing the exudates will affect the
dressing selection
.

Wound bed appearance

- It can help to identify and prioritize the treatment objectives
  Necrotic
  Sloughy
  Granulation
  Epithelialisation

❖ **Necrotic Tissue**

- Necrotic tissue is localised areas of dead tissue
-It will always prolong healing and should be removed.

❖ **Slough**

-Slough is formed from dead cellular debris which gathers on the wound bed
-It is creamy / yellow in colour due to the large amount of leucocytes it
contains
-In Chronic wounds slough may mix with fibrous tissue, which makes it
more
difficult to remove.

❖ **Granulation tissue**

-This is the new tissue which is identified by it's bright red colour and uneven texture
-Unhealthy granulation tissue looks pale and may bleed spontaneously.

❖ **Epithelial.**

-Appears once granulation tissue has covered the wound bed
-It is pink / white in colour and can be seen at the wound margin or from the remnants
of the hair follicles.

Condition of surrounding skin

There can be a range of problems

- Trauma due to frequent removal of adhesive tape
- Allergic reaction to tapes, lotions
- Maceration due to persistent heavy exudates, which is poorly controlled by the dressing.

Odour

- Can be very distressing for the patient and lead to social isolation
- As necrotic tissue liquefies it releases a malodour
- Malodour can be an indication of infection
- Some wound dressings as they interact with the wound exudates, can release an odour.

Pain

- Pain can cause distress and anxiety for patients
- Adequate pain management should be implement for patients that experience pain.

Removed dressing

It is always helpful to look at the dressing which you have just removed

- Is the dressing to dry / wet ?
- Debris left in wound bed ?
- Purulent discharge
- Odour

Wound Infection

- Infection delays healing, by prolonging the inflammatory phase
- All wounds are colonised by bacteria, but

that does not indicate an infection is present.

- **Pathogens :**

  Viruses, fungi and bacteria may cause wound infections.

the main agent for wound infection is bacteria

- It's not always possible to ascertain from a wound swab alone, that a wound is infected.
- Remember all chronic wounds contain bacteria, so there is the need to assess the wound, to see if it is infected.

- **Wounds with pathogenic bacteria may manifest the following signs**

  - Red (Erythema)
  - Increased pain at wound site
  - Malodor
  - Increased slough on wound bed
  - Granulation tissue may be pale in colour
  - Increased exudates level
  - Purulent or non-purulent discharge
  - Bridging or pocketing at base of wound
  - Non-healingwound.

- Remember immuno-suppressed patients don't always show the classic immune response or the response may be only slight.

Summary of modern dressings

- Fluid handling properties
- Non-adherent to the wound bed
- Non allergic
- Allow gaseous exchange
- Protects against dehydration
- Adhere well to the surrounding skin
- Comfortable to wear .
- Remove excess exudates
- Be impermeable to bacteria
- Sterile
- Easy to handle
- Does not require frequent changing

Wound cleansing

Why to clean the wound?

- To eliminate bacteria from the wound bed.

- To decrease bacterial growth at wound bed
- To allow proper environment for normal healing process

Cleansing:

- Should be done to remove slough or necrotic tissue and the remnants of previous dressing.
- Wounds caused by Accidental trauma contain large amounts of debris and require thorough cleaning.

Antiseptics

- Sodium Hypochlorite
- Chlorhexidine
- Hydrogen peroxide
- Potassium permanganate
- Iodine
- Iodine-based solutions(povidine)
- Silver.

Antiseptics general disadvantages:

- Do Not penetrate tissue
- When some of them come into contact with organic matter they are inactivated.
- Harmful to tissue
- Have to be in contact with bacteria for an extended amount of time, before they can destroy bacteria.
- Limited shelf life, due to chemical instability.
- To be effective, requires frequent usage.
- Reported increase in pain and discomfort.
- Leakage is associated with maceration of skin.

IODINE

- Broad spectrum antiseptic
- Pseudomonas
- For superficial wound infections
- Use aqueous solution, NOT alcohol solution.
- Comes in low-adherent dressing.

SILVER

Kills a broad spectrum of wound
Pathogens MRSA VRE

- Silver sulphadiazine (Flamazine)
- Aquacel Ag contains silver which is slowly released from the dressing.

NORMAL SALINE

- No documented adverse effects
- Available in most areas
- Cost effective

CLEANSING TECHNIQUE

- Swabbing (gauze, cotton wool) results in distributing bacteria, across the wound bed.
- Can leave debris on the wound bed.!!

- Too forcefully, can cause further damage to healthy tissue.
- Foreign bodies, can be further imbedded into the wound bed

WOUND IRRIGATION

- Irrigation under pressure use precautions ?
- 30 ml syringe and an 18 -20G needle is recommend for infected wounds.

WOUND CLEANSING DISADVANTAGES

- Healing potential can be reduced, as exudates, which contains bacterial properties and growth factors are washed away from the wound bed.

SUMMARY OF WOUND CLEANSING

- It is a habit to use antiseptics
- If systemic antibiotics are being used, why use local?
- They have many side effects
- Saline 0.9% can be just as effective
- Only cleanse when necessary .
- Wounds that are clean with healthy tissue do not need cleaning.

THE MANAGEMENT OF CHRONIC WOUNDS

Management and prevention of pressure sores

Pressure sores/decubitus ulcers//bed sores

Definition: localized damage of the skin caused by disruption of the blood supply to the
area by pressure / shear / or friction.

Etiology:

1. **External factors**:
   - **Pressure**:

   When soft tissues compressed between a bony prominence and a hard surface causing pressure greater than capillary pressure, localized ischemia occurs

   Capillary pressure is generally described as being approximately 32 mmhg.9 Landis 1931) but the average venule pressure is 12mmhg.

   Unrelieved pressure leads to necrosis and destruction of the tissues closed to the bone.

   - **Shear:**

   Occurs when the patient slides down the bed

   Shear forces can deform or disrupt tissue

   - **Friction:**

   Occur when two surfaces rub together, commonly happened when the patient dragged rather than lifted across the bed

2. **Internal factors:**
    - **General health**:
      Pain / low blood pressure / heart failure / sedatives / shock / age over 65 years old
    - **Reduced mobility**:
      May be related to neurological defect
      Drugs: sedatives/ opoids/ analgesics
    - **Reduce nutritional status**:
      Lead to impairment of elasticity of the skin
      Anemia / low oxygenation to the tissues
    - **Body weight**
    - **Incontinence**
    - **Poor blood supply**

PREVENTION OF PRESSURE SORES

1. Written policy for the prevention and management of pressure sores
2. Training and education
3. Regular surveys of prevalence and incidence of pressure sores
4. Establishing risk assessment system
5. Availability of resources for management
6. Appropriate and early medical referral/plastic/surgery/podiatric and supportive system
7. Patient positioning every 2-3 hours according standardized method
8. Using standardized hospital mattresses 130 mm thickness
9. Preventive measures:
    - Pressure relieving beds:
    - Pressure relieving mattresses: air mattreses/foam/gell/water/fibre overlays/combination foam and water, or foam and gel mattresses
    - Additions to beds: bed cradle/ back rests/
    - Chairs: reclining back not more than 10 degrees to move freely.
    - Cushions
    - Pneumatic pressure redistribution machines

MANAGEMENT OF PRESSURE SORES

1. The position of pressure sore: 31% sacral/27% in the buttock
2. Pressure sores grading system: according American national pressure ulcers advisory panel 1989
    - stage one: non blanchable erythema of intact skin
    - Stage two: partial thickness skin loss involving epidermis and /or dermis/superficial-may be seen as a blister, or abrasion
    - Stage three: full thickness wound involving epidermis/dermis/ and subcuticular layer, with undermining area.
    - Stage four: extensive destruction involving other tissues like muscles, tendons, or bone prominence.

3. Pressure sores appearance

4. Selection of wound management products/strategy

Stage one: semi permeable film dressings

Stage two: semi permeable film dressings/ foam /thin hydrocolloids

Stage three: necrotic tissues with exudates: alginate/hydrogel

Necrotic tissues without exudates: hydrogen/hydrocolloids

Slough with exudates: alginates/hydrogel/hydrocolloids

Granulated tissues with exudates: alginates/ hydrogel/hydrocolloids/foam

Dressings

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Instructor curriculum vitae

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Education:

1. Post graduate (PhD.) student/Demon fort university/Leicester/England 2003 –2007/Impact of wound assessment on wound management practice
2. MsC. /Nursing Education/1996 – 1998/ University of Jordan
3. BsC. Nursing /1993 – 1995/ University of Jordan
4. Diploma Nursing/1987 – 1990/ JordanCollege of Nursing/Ministry of Health

Experiences:

1. Wound Care Coordinator / Riyadh – AlkharjMilitaryHospital /Saudi Arabia/ September 2003
2. Assistant medical director for nursing affairs/ Specialty hospital – Amman – Jordan/march 2003-July 2003.
3. Trained nurse / Work base resources nursing agency /England/ July2002 – February 2003
4. Part time lecturer and clinical instructor/ Al Zaytoonah University-Amman-Jordan/ 1999-2003
5. In charge of training and education department /Specialty hospital /Amman -Jordan July 1999 – July 2002.
6. Clinical instructor/Ministry of health/Amman-Jordan/1995 – 1999
7. RGN/Ministry of health/ 1992 - 1995

1. RGN/ Royal Jordanian Medical Services

Courses and special training

1. Clinical instructors diploma / 1995 – 1996/Ministry of health/ Jordan
2. Clinical instructors tutor courses/1996 – 1998/ Ministry of health / Jordan
3. Continuing education program courses /1999 –2002/Specialty hospital //Jordan
4. Minimal handling and lifting /July 2002/Newburry- England
5. Internal auditing workshop/2001/Amman- Jordan
6. Euro –Jordanian coalition marketing workshop/2000/Amman- Jordan
7. Total quality management workshop/2001/ Amman-Jordan

Professional commitment

1. Jordanian nurses and midwives council/Jordan
2. Jordanian association for organ donation/Jordan
3. Tissue viability society/ Salisbury - England

Appendix9

Form of content validity criteria

Dear Dr,

I am, Jamal Qaddumi, a PhD student in school of nursing at University of Jordan. I need your help in evaluating the content validity for the PU attitude tool; this tool will be used as instrument in my dissertation. Specifically, this tool will be used to measure attitudes of nurses toward pressure ulcer in my study. Participants will be Jordanians nurses working in Amman hospitals.

Nurses' attitudes towards pressure ulcer prevention were explored by PU attitude tool where the response-option utilizes a 5-pointLikert scale.This type of response option was chosen because it allows scaling of an individual's attitude to an issue and is more sensitive to the full range of possible attitudes than a simple dichotomous agree/disagree option (Oppenheim, 1992). The tool used in previous studies and has showed acceptable psychometric properties (Moore & Price, 2004).

For each item, I will appreciate your input and comments regarding relevancy, accuracy, adequacy, clarity, and representativeness. A description of these five criteria is represented in box 1 below. For each one of these five criteria, please use the 4- point likert scale where (1 = not relevant to 4 = high relevant).

Please use box 2 to provide your comments, use box 3 to fill the short Demographic questionnaire.

Box 1 **Evaluation Criteria**	**Description of theEvaluation Criteria**
Relevancy	Having a connection with matter at hand (socially & practically applicable).
Accuracy	The ability of the tool to match the actual value of the quantity being measured.
Adequacy	Sufficient to satisfy requirements (measure all the dimensions of the construct).
Clarity	Clearness of thoughts, construct, and wording (e.g.; not obscured and not confused).
Representativeness	Serving as a typical example.

Box 2. Criteria for Measuring Content Validity

Not relevant			High relevant
…………………………………………*………………………*			
1	2	3	4

Item	**Relevancy**	**Accuracy**	**Adequacy**	**Clarity**	**Representativeness**
(1) All inpatients are at potential risk of developing pressure sores					
(2) Pressure sore prevention is time consuming for me to carry out					
(3) In my opinion, patients tend not to get as many pressure sores nowadays					
(4) I do not need to concern myself with pressure sore prevention in my practice					
(5) Pressure sore treatment is a greater priority than pressure sore					

prevention					
(6) Continuous nursing assessment of patients will give an accurate picture of their pressure sore risk					
(7) Most pressure sores can be avoided					
(8) I am less interested in pressure sore prevention than other aspects of nursing care					
(9) My clinical judgment is better than any pressure sore risk assessment tool available to me					
(10) In comparison to other areas of nursing care, pressure sore prevention is a low priority for me					
(11) Pressure sore risk assessment should be regularly carried out on all patients during their stay in hospital					

Box 3. Demographic questionnaire

Your Scientific degree	
University of graduation	
Work place	
Specialty area.	
Courses that you teach	
Published researches:	

اثر التعليم حول التقرحات السريريه على معلومات واتجاهات ونوايا الممرضين نحو الوقاية من قرحة الضغط (التقرحات السريرية) ومعالجتها

اعداد
جمال عبد المعطي صالح قدومي

المشرف
الاستاذ الدكتورماضي الجغبير

المشرف المشارك
الدكتورة سميحه جراح
الاستاذ الدكتور دينيس انتوني

الملخص

قرحة الضغط (التقرحات السريرية) ليست مشكله صحية حديثه التطور، فقد عرفت منذ زمن المصريين القدامى. وعلى الرغممن الزيادة في الإنفاق و التطورات التقنية الحديثة في الرعايةالصحيةلمنعقرحة الضغطإلا أنها لا تزال مشكلةصحيةو تحدث بمعدلات مرتفعه وتضع عبئا كبيرا على المرضى والعاملين في مجال الرعاية الصحية وكذلك المستشفيات ، علما بأن هذه التقرحات يمكن الوقاية منها إلى حد كبير.

هنالك ضعف لدى الممرضين في إتباع الإرشادات والتعليمات الخاصة بالحد من قرحة الضغطومعالجتها ويوزع ذلك لقلة المعلومات لديهم وبالتالي فان البرامج التعليمية الخاصة بقرحة الضغطستحد من هذه المشكلة.

تهدف هذه الدراسةإلى معرفةتأثير التعليم على المعلومات واتجاهات ونواياالممرضين نحومنع و معالجةقرحة الضغط.

تم استخدام المنهج التكاملي: الطريقةالتجريبية باستخدام الاختبار القبلي و البعدي للمجموعة التجريبية و مقارنتها معالمجموعةالمقارنة و تم اختيار 194 ممرض قانوني للمشاركة في هذه الدراسة بطريقة عشوائية،و تم قياس المعرفة التمريضية حول التقرحات السريرية باستخدام اختبار المعرفة وقياس الاتجاهات والنوايا باستخدام استبيان قرحة الضغط. بالإضافة للطريقة التجريبية تم عمل مجموعه مركزة وذلك لدعم نتائج البحث الكمي والاستكشاف الأعمق للموضوع.

أظهرت نتائج الدراسةأن البرامج التعليمية تحسن المعرفةلدى الممرضين واتجاهاتهم ونواياهمنحومنعو معالجة قرحة الضغط.أظهرت هذه الدراسة أيضا أن المتغيرات الديموغرافية للممرضين لا يوجد لها آثارا تذكر على المعرفة والاتجاهات والنوايا لدى الممرضين نحو منع ومعالجة التقرحات السريرية.

كما أنالدراسة خلصت من خلال المجموعة المركزة إلى عدة مواضيعومنها عدم وجود معلومات دقيقة في معالجة التقرحات السريرية.قيم إيجابية لى الممرضين حول منع قرحة

الضغط.الممارسات التمريضية التقليدية و المعوقات مثل نقص الكوادر التمريضية،ضيق الوقت ، و قلة المعدات التي تستخدم لوقاية وعلاج قرحة الضغط.

يستنتج من هذه الدراسة أن البرامج التعليميةتحسن المعرفة التمريضية نحو منع و معالجة قرحة الضغط. وأن هناك حاجه لعمل مثل هذه البرامج لكل الكوادر التمريضية و الاستمرار في تحديث هذه البرامج حيث أن البرنامج التعليمي يمكنأنيساعد الكوادرالتمريضية في تحسين العنايةالمقدمة للمرضى و تساعد المستشفيات و مؤسساتالرعايةالصحية من اجل تطوير بروتوكولات و إرشادات على مستوى وطني تستطيع من خلالها أن تحسن الرعايةالتمريضيةالمقدمة للمرضى.

الكلمات الرئيسية: قرحة الضغط،التقرحات السريرية، المعرفة، الاتجاهات، النوايا ، الوقاية و المعالجة.